

Year XVIII ✓
NEW SERIES ✓

December, 1927

INTERNATIONAL INSTITUTE OF AGRICULTURE

INTERNATIONAL REVIEW OF AGRICULTURE

PUBLISHED MONTHLY



312037
IARI

ROME

PRINTING OFFICE OF THE INTERNATIONAL INSTITUTE OF AGRICULTURE

1927

Also to be obtained from

THE MINISTRY OF AGRICULTURE AND FISHERIES
Whitehall Place, London.

P. S. KING AND SON LTD.
Great Smith Street, Westminster, London.

INTERNATIONAL INSTITUTE OF AGRICULTURE

PERIODICAL PUBLICATIONS

I. INTERNATIONAL REVIEW OF AGRICULTURE: Complete edition - 90 liras p. a.

SPECIAL EDITIONS : --

(a) **International Review of the Science and Practice of Agriculture:** 65 liras p. a.

(b) **International Review of Agricultural Economics:** 45 liras p. a.

(c) **International Bulletin of Plant Protection:** 20 liras p. a.

II. INTERNATIONAL CROP REPORT AND AGRICULTURAL STATISTICS: *Anglo-American, French, Italian, Spanish Editions:* 45 liras p. a.

III. COMBINED SUBSCRIPTION FOR NOS I AND II. 125 liras p. a.

International Yearbook of Agricultural Statistics, 1926-27.

90 LIRAS (CLOTH BOUND 100 LIRAS).

International Yearbook of Agricultural Legislation, 1926.

60 LIRAS.

PRINCIPAL PUBLICATIONS OTHER THAN PERIODICAL

Monographs on Agricultural Products and Fertilizers.

Oleaginous Products and Vegetable Oils -- Production and Trade.

(1926, 191 pp., 8vo)

L. 15 --

The Cotton Growing Countries. Production and Trade (1927, XXIV + 148 pp., 8vo) published by P. S. King & Son, Ltd. London, S. W. 1

5 shillings

A new and enlarged edition entitled "*Cotton Growing Countries, Present and Potential*" was published by P. S. King & Son, Ltd. London, S. W. 1 in 1926

12 s. 6 d.

Production et consommation des engrais chimiques dans le monde (Third Edition, 1924, 266 pp., maps and diagrams, 8vo)

L. 25 --

Milk and Milk Products (Statistical Survey of Production and Trade) (1924, 145 pp., 8vo)

s. 20 --

La distribution du froment dans le monde. Données statistiques et cartogrammes sur la superficie cultivée et la production (1927, 46 pp., 8vo).

s. 15 --

Forestry.

Forests and Forestry (Statistical and other information for certain countries) (1925, 420 pp., 8vo).

L. 40 --

Reduction of Weights and Measures.

Recueil de coefficients et d'équivalences (Fourth Edition, 1924, 191 pp., 16mo)

L. 15 --

Plant Protection.

La lutte contre la mouche des olives dans les divers pays (1922, 89 pp., 8vo)

L. 5 --

Etat actuel de l'organisation de la lutte contre les sauterelles dans les divers pays. Results of an International Enquiry. (1916, 188 pp., 8vo).

s. 15 --

INTERNATIONAL REVIEW OF AGRICULTURE

PUBLISHED

BY THE

INTERNATIONAL INSTITUTE OF AGRICULTURE



New Series

XVIIIth Year No. 7. — August, 1927.

ROMA

PRINTING OFFICE OF THE INTERNATIONAL INSTITUTE OF AGRICULTURE

—
1927

= ECONOMIC AND SOCIAL
QUESTIONS - SCIENCE AND
PRACTICE OF AGRICUL-
TURE - SYLVICULTURE -
PLANT PROTECTION - STA-
TISTICAL NOTES - AGRI-
CULTURAL LEGISLATION -
AGRICULTURAL ASSOCIA-
TIONS - CURRENT NOTICES
- NOTES ON THE INTER-
NATIONAL INSTITUTE OF
AGRICULTURE - LIBRARY
ACQUISITIONS ————

CONTENTS

ECONOMIC AND SOCIAL QUESTIONS.

CO-OPERATION AND ASSOCIATION. — Scope and Work of the Argentine Agricultural Federation, *p.* 797. — Co-operative Fruit-growing Societies in Argentina, *p.* 798. — The Social and Economic Work of the "Boerenbond" in Belgium, *p.* 799. — The Co-operative Marketing of Dark Tobacco in the United States, *p.* 801. — Proposed Honey Marketing Association for the "Inter-mountain" States, *p.* 803. — The Costs of Operation of Farmers' Elevators in the United States, *p.* 803. — Constitution of the Provincial Economic Bureaux and Councils in Italy, *p.* 804.

INSURANCE AND THRIFT. — General Crop Insurance in the United States, *p.* 806. — Hail Insurance in Saskatchewan, Canada, *p.* 808.

ECONOMIC AND SOCIAL CONDITIONS OF THE AGRICULTURAL CLASSES. — Living Expenses of Farmers in the United States, *p.* 809. — Proposals for Counteracting the Depopulation of Country Districts, Italy, *p.* 810.

LAND SYSTEMS. — Establishment of small Holdings in Denmark with State Loans, 1900-1926, *p.* 812. — Facilities given for European Immigration, Ecuador, *p.* 815.

MARKETING OF AGRICULTURAL PRODUCE. — The Cuban Sugar Commission and Crop Limitation, Cuba, *p.* 816. — Diminution in the Average Consumption of Flour in the United States, *p.* 817. — The Marketing of Cheese in England *p.* 817. — The Abolition of the Grain Monopoly and the New Measures for promoting and protecting Grain Growing in Norway, *p.* 818. — Overseas Marketing of Dairy Produce in New Zealand, *p.* 819.

MISCELLANEOUS. — A Plan for the Development of Agriculture in Colombia, *p.* 824. — The Decisions of the IVth Assembly of the U.S.S.R. Soviets on the Basic Problems of Rural Life, *p.* 827.

THE SCIENCE AND PRACTICE OF AGRICULTURE.

GENERAL, AGRONOMY AND TEMPERATE CLIMATE CROPS. — Agricultural Conditions in Norway, *p.* 829. — The Education of Present and Future Farmers, *p.* 829. — Experimental Work in Malaya, *p.* 830. — Notes on a possible Interpretation of certain young Plant Forms, *p.* 832. — A Physiological Study of the Effect of Light of various ranges of Wave Length on the Growth of Plants, *p.* 833. — Importance of Calcium to the Growth of Roots

p. 834. — Contribution to the Study of the Action of Copper Sulphate of the Soil on Growing Plants, *p.* 834. — Optimum H-ion Concentration in Culture Media for certain of the lower Fungi, *p.* 835. — Formation of Vitamin B by *Bac. vulgaris* (Flügge) Migula from Vitamin-free Nutrient Solution, *p.* 836. — Seed Selection as a Factor in the Improvement of the Yield of Crops, *p.* 836. — Report on Research Organization in Agricultural Technology in Czechoslovakia, in 1924-1925, *p.* 837. — Land Improvement Schemes in the "Agro Romano" and the "Agro Pontino", Italy, *p.* 837. — A satisfactory Crop Rotation in use at Ancona, Italy, *p.* 838. — Primer of Soil Science, *p.* 838. — The Formation of the Earth's Crust as the Basis of Soil Science, *p.* 839. — Treatise on the most important Kinds of Soil Based on the Latest Researches on their Petrographic-Geologic Composition, *p.* 839. — Do Colloids Exist as a Coating around the Soil Grains?, *p.* 839. — The Moisture Equivalent of Soils, *p.* 840. — The loss of Soluble Salts in Runoff Water, *p.* 840. — Contributions to the Study of Loess Loam and to Soil Diagnosis, *p.* 841. — Influence of Cultivation on the Water Content of the Soil, *p.* 841. — Experiments on the Neubauer Seedling Method, *p.* 842. — A study of the Factors influencing the Efficiency of different forms of Nitrogen as related to Soil Type and Cropping System in the Atlantic Coastal Plain Region: Part I., *p.* 843. — The Use of Oat Straw in a System of Soil Fertility, *p.* 844. — Relation of Fineness of Grinding to Rate of Sulphur-Oxidation in Soils, *p.* 845. — The Utilization of sour Podsol and marshy Soils on Clay Subsoil, *p.* 846. — The Water Economy of the Chalk Flora of England, *p.* 846. — Accelerating the Sprouting of Potato-tubers with Carbon-Bisulphide, *p.* 849.

ANIMAL HUSBANDRY. — The Somatometer, a New Instrument for Measuring the Bodies of Animals, *p.* 850. — Blood Dry Matter in the Individual and Race, *p.* 851. — Nutritive Value of Pasture, *p.* 852. — The Origin of Hippuric Acid eliminated in the Urine of Ruminants, *p.* 853. — The Control of Cattle Tuberculosis, *p.* 854. — First Attempts at anti-Foot-and-Mouth Disease Inoculation by use of Foot-and-Mouth Vaccine Complexes, *p.* 855. — Live Stock Fluorose and Nitrous Gases, *p.* 855. — Dual-purpose Cattle, *p.* 856. — Influence of Feeding on Enzymes in Cows' Milk, *p.* 856. — The Influence of Sun or Artificial Ultra-Violet Ray Treatment of Cows on the Secretion of Anti-rachitic Milk, *p.* 857. — The Influence of Ultra-Violet Light upon Calcium and Phosphorus Metabolism in Milking Cows, *p.* 858. — Results of testicular Grafts on the Flocks of the Government-General of Algeria, *p.* 859. — The Origin of the Caracal Sheep of Bokhara and the Derivation of the curly Fleece of their Lambs, *p.* 860. — Contribution on Sheep Breeding in Saxony, *p.* 860. — Are Experiments on Pigeons suitable for determining Vitamin B in fresh and preserved green Fodder?, *p.* 861. — On the Existence of Egg-Laying Cycles in the Domestic Fowl, *p.* 861.

AGRICULTURAL INDUSTRIES. — The Value of Milk in Calories, *p.* 863. — Production of the Scent and Flavour of "Caramel" in Milk Products by *Streptococcus lactis* Lister, *p.* 864. — Simple Method of exact Determination of the Richness of Milks, *p.* 865. — Unequal Acidity in the two Faces of a Cheese, *p.* 866. — A Comparison of some Physical and Chemical Tests for

determining the Quality of Gluten in Wheat and Flour, *p.* 866. — The Destruction of Gossypol, a Toxic Factor in Cottonseed Products, *p.* 867. — The Exportation of Sugar Preserved Eggs, *p.* 868.

SYLVICULTURE

The Question of Diplomatic Representation for Forestry, *p.* 869. — Forestry Work and Difficulties in Bulgaria, *p.* 869. — Forestry in the State of Mysore, *p.* 870. — Sylviculture in Federated Malay States, *p.* 872. — Valuable Chilian flora, *p.* 783. — The Ramification of Roots, and its Importance in Forestry, *p.* 873. — "Tlaia" (*Tamarix articulata* Vahl), *p.* 874. — Beach Forests near Koetoardjo (Java), *p.* 875. — The Analysis of the Forests in the Islands Poelve Laoet and Deboekoe (Borneo), *p.* 875. — The Age of the Teak Forests in the North-Eastern Part of the Residency Madioen (Java), *p.* 875. — Teak Forest Management in Java, *p.* 875. — Regeneration and Cultivation of the Teak, *p.* 876. — The Position of Java-Teak on the World Market, *p.* 876.

PLANT PROTECTION.

DISCOVERIES AND CURRENT EVENTS IN WORLD PHYTOPATHOLOGY. — Belgium : First Notification of the Existence of "Wart Disease" of the Potato, *p.* 877. — Ceylon : A newly-found Cause of Root Disease of Ceylon Plants, *p.* 877. — Iraq : Phytopathological Notes, *p.* 878. — Italy : Diseases of Lilac and of *Aster* sp. in Piedmont, *p.* 879. — Rumania: Apple Powdery Mildew, *p.* 879.

VARIOUS QUESTIONS RELATING TO PLANT PROTECTION IN THE DIFFERENT COUNTRIES. — Algeria : Flights of *Docostaurus maroccanus* during the Month of June, 1927, *p.* 879. — Dominican Republic : Chief Insects harmful to Crops, *p.* 880. — Uruguay : Brief Note regarding *Icerya purchasi* and its Control by *Novius cardinalis*, *p.* 883.

LEGISLATIVE AND ADMINISTRATIVE MEASURES. — England, *p.* 884. — Canada *p.* 885. — Eritrea, *p.* 886. — Italy, *p.* 886. — Luxemburg (Grand Duchy of), *p.* 887.

RECENT BIBLIOGRAPHY, *p.* 888.

STATISTICS.

PRODUCTION ESTIMATES AND CROP CONDITIONS, *p.* 893.

PRODUCTION OF CEREALS, *p.* 894.

INTERNATIONAL TRADE, *p.* 897.

PRICE FLUCTUATIONS (WHEAT, MAIZE AND COTTON), *p.* 900.

AGRICULTURAL LEGISLATION.

SUMMARY OF NEW LAWS AND REGULATIONS, *p.* 901.

AGRICULTURAL ASSOCIATIONS.

I. GENERAL NOTICES. — Denmark, *p.* 908. — Dutch Indies, *p.* 908.

CURRENT NOTICES.

AGRICULTURAL INSTRUCTION AND EXPERIMENT. — Agricultural Experiments in Algeria, *p.* 909. — Movement for Popularisation of "Mole-plough" Drainage in the Country Districts of France, *p.* 910. — Rubber Experiment Station in Ceylon, *p.* 910. — Irrigation Works in Chile, *p.* 910. — Vegetable-canning Industry in Haiti, *p.* 910. — The Preservation of Natural Scenery in New Zealand, *p.* 911. — Activity of the British Guiana Sugar Planters Experiment Station at Sophia, *p.* 911. — Handsome Indian Foundation for Promoting the Development of Agriculture in the Punjab, *p.* 911. — Experiments in Italy with Retorts for the Carbonization of Wood, *p.* 912. — Agricultural Instruction in Mexico, *p.* 912.

AGRICULTURAL AND SCIENTIFIC ASSOCIATIONS AND INSTITUTIONS. — International Association of Superphosphate Manufacturers, *p.* 912. — Protection of the Sugar Market in the State of Pernambuco, Brazil, *p.* 912. — Reorganization of Government Services for Industry and Commerce in Chile, *p.* 913. — The Agricultural Bureau at Guayaquil, *p.* 913. — The Soil Science Bureau of the United States incorporated with the Bureau of Chemistry, *p.* 913. — The National Institute of Agricultural Botany, Great Britain, *p.* 913. — Prize Competitions for Tree planting in the Campagna and the Pontine Marshes, *p.* 914. — Italian Institute of Rural Economy, *p.* 914. — Italian Medicinal Plants, *p.* 915. — The Encouragement of Agricultural Work by the Italian State Railways, *p.* 915. — Facts relating to the Cultivation of Wheat in Italy, *p.* 915.

CONGRESSES AND CONFERENCES. — VIII International Conference of Pure and Applied Chemistry, Warsaw 4-13 September 1927, *p.* 916. — V International Botanical Congress, *p.* 916. — International Congress of Viticulture and the Science of Vine growing. Conegliano, Italy, 28-29 May 1927, *p.* 916. — Sugar Conference in Cuba, *p.* 916. — Congress on Synthetic Nitrogenous Fertilizers, Montpellier, France, June 1927, *p.* 917. — Congress of Viticulture, Montpellier, France, first ten Days of June 1927, *p.* 917. — The River Po Congress, Piacenza, 1927, *p.* 917.

EXHIBITIONS, FAIRS, COMPETITIONS. — Fisheries Industry Exhibition, Kiel, Germany, *p.* 918. — Iberian-American Exhibition, Rio de Janeiro, 1928, *p.* 918. — The Royal Agricultural Society's Exhibition at Newport, July 1927 and the Exhibit of the Rothamsted Experimental Station of Harpenden, *p.* 918. — Agricultural Exhibition. Leeuwarden, Holland, 5-10 September 1927, *p.* 918. — International Competition of Reed and Cane Cutting Machines, Paris, 19-26 July 1927, *p.* 918. — North African Agricultural Competition. Boufarik, Algeria, 14-29 May 1927, *p.* 918. — Competition announced by the Italian National Institute for the Scientific Organisation of Work, *p.* 918.

MISCELLANEOUS. — World List of Scientific Periodicals, *p.* 918. — A new Cuban Industry, *p.* 919. — A National Arboretum at Washington, *p.* 919. — Specimens of Tropical Timbers for Museums or Research Institutions, *p.* 919.

JOURNALS AND REVIEWS. — Svenska Linne-Saliskapets Arskrifts, *p.* 920.

NOTES ON THE INTERNATIONAL INSTITUTE OF AGRICULTURE.

International Congress for the Betterment of Rural Life, *p.* 921. — Delegates on the Permanent Committee of the Institute, *p.* 921. — New adherent States, *p.* 921. — The World Agricultural Census of 1930, *p.* 921.

LIBRARY ACQUISITIONS, *p.* 922.

INTERNATIONAL REVIEW OF AGRICULTURE

PUBLISHED

BY THE

INTERNATIONAL INSTITUTE OF AGRICULTURE



New Series

XVIIIth Year — No. 8. — September, 1927.

ROME

PRINTING OFFICE OF THE INTERNATIONAL INSTITUTE OF AGRICULTURE

1927

= ECONOMIC AND SOCIAL
QUESTIONS - SCIENCE AND
PRACTICE OF AGRICUL-
TURE - SYLVICULTURE -
PLANT PROTECTION - STA-
TISTICAL NOTES - AGRI-
CULTURAL LEGISLATION -
AGRICULTURAL ASSOCIA-
TIONS - CURRENT NOTICES
- NOTES ON THE INTER-
NATIONAL INSTITUTE OF
AGRICULTURE - LIBRARY
ACQUISITIONS =====

CONTENTS

ECONOMIC AND SOCIAL QUESTIONS.

- CO-OPERATION AND ASSOCIATION. — Cotton Growing and Co-operation in the Central Provinces and Berar (India) in 1925-26, *p.* 925. — Agricultural Co-operation in Bombay Presidency (India), *p.* 928. —
- CREDIT. — New Regulation of Agricultural Credit in Italy, *p.* 930. — Institution of the Federation of « Pósitos » and Agricultural Colonies in Spain, *p.* 933. — The Agricultural Policy of the Argentine National Bank, *p.* 934.
- LAND SYSTEMS — Land Settlements in New Zealand, *p.* 935
- FARM ECONOMICS. — The Profit-earning Capacity of Swiss Agriculture in 1925-26, *p.* 936 — The Earnings of Farmers in Iowa (United States), *p.* 946.
- MARKETING OF AGRICULTURAL PRODUCE — Forecasting the Price of Hogs in the United States, *p.* 947 — Export Control of Fruit and other Perishable Products in the Union of South Africa, *p.* 954.

THE SCIENCE AND PRACTICE OF AGRICULTURE.

- GENERAL AGRONOMY AND TEMPERATE CLIMATE CROPS — Broadcasting Weather Maps by Radio in the U. S. A., *p.* 957 — The Water Requirement and Cell-Sap Concentration of Australian Saltbush and Wheat as related to the Salinity of the Soil, *p.* 957. — Temperature near the Surface in various kinds of Soils, *p.* 958 — Soil Sterilisation by Heat for Glasshouse Crops, *p.* 959. — The Composition and Distribution of the Protozoan Fauna of the Soil, *p.* 960. — New Phosphate Deposits in Spain, *p.* 961. — The Minerals of the Dead Sea, *p.* 961. — Ammoniacal and Nitric Fertilizers, *p.* 962. — The Problem of Rate of Soil Liming, *p.* 962. — Seaweed as Manure, *p.* 962. — Processes for rendering soluble the Phosphoric Acid in Natural Phosphates by means of Silica, *p.* 963. — The Chemical Change of Cyanamide Nitrogen in the Soil, *p.* 963. — Action of Potassic Fertilizers on the Microbial Flora of the Soil, *p.* 964. — Lucerne Manuring, *p.* 965 — Treatment of Seeds of Leguminous Plants with Sulphuric Acid, *p.* 965. — Fertility in the Genus *Brassica*, *p.* 966. — Biological Station of Besse, Puy-de-Dôme, France, *p.* 967. — An Ecological Study in Utah, U. S. A., *p.* 967. — Importance of Size of Potato « Seed » on the Improvement and Cultivation of Potatoes, *p.* 968.

- Choice of Seed Potatoes, *p.* 969. — Potato Variety Trials in South Africa, *p.* 969. — The Weather and the Hay Harvest in New York State, *p.* 970. — Fertilizing Experiments on Fruit Trees in Australia, *p.* 971. — Rapid Bagging for Securing Choice Fruit, *p.* 971. — Composition of Raisins from Cyrenaica, *p.* 971.
- TROPICAL AGRICULTURE.** — Cacao Yeasts, *p.* 973. — Correlations of Seed, Fibre and Boll Characters in Cotton, *p.* 974. — Cotton Production in New Caledonia, *p.* 975. — The Brazil Nut, *p.* 976. — Experiments on Kokerit Fruits, *p.* 978. — The Cultivation of Guaraná, *p.* 978. — Sump. (*Balanitis aegyphaca* Del.), *p.* 979. — *Meriandra bengalensis* and its Essential Oil, *p.* 981. — Ylang-Ylang, *p.* 981. — The Use of Agave Pulp for the Manufacture of Industrial Alcohol, *p.* 982. — Yield of budded Rubber Trees, *p.* 983. — Latex and Rubber from Young Trees, *p.* 983. — Properties of Rubber from different Clones and their Mother Trees, *p.* 983.
- AGRICULTURAL ENGINEERING.** — The Organization of an Electric Tillage Plant, *p.* 984. — A Mower for Steep Hillsides, *p.* 984. — Trials of Subsoiling in 1925, in England, *p.* 985. — Irrigation in Italy: the Artificial Lake of Val Borbera, *p.* 986. — Combination Farm Operations, *p.* 987. — Drainage Ploughs, *p.* 987.
- ANIMAL HUSBANDRY.** — Maisarin, a New Molasses Feed, *p.* 988. — The Effect of Feeding Thyroid to Fowls, *p.* 989. — Poultry Disease Control, *p.* 990. — The Method of Honey-Production by Bees and Time involved, *p.* 990.
- AGRICULTURAL INDUSTRIES** — Decolorizing Carbons and their Action on Molasses, *p.* 992. — Practical Notes on Fermentation in Copper Vats, *p.* 993. — A Use for the Plant and Seeds of the Mercury Family, *p.* 993. — New Methods of Converting Straw to Industrial Uses, *p.* 994. — The Fixation of Bacteria in Market Milk Samples, *p.* 995. — The Use of Lime in Butter-Making, *p.* 995.

SYLVICULTURE

- Some Reflexions on the Problems of Heredity, *p.* 997. — The Growth of the Wood of Ash and Douglas Fir, *p.* 998. — Relationship between Weather and Fire Risks, *p.* 999. — Forest Fire Losses in the South of the United States, *p.* 1001. — Notes on the Natural Regeneration of Eucalyptus, *p.* 1001. — The Swamp Cypress of China and North America, *p.* 1002. — Forestry in the Andaman Islands in 1924-25, *p.* 1003.

PLANT PROTECTION.

- DISCOVERIES AND CURRENT EVENTS IN WORLD PHYTOPATHOLOGY.** — Canada: General Notes on Diseases recently recorded, *p.* 1005. — Belgian Congo: New or particularly interesting Diseases, *p.* 1005. — Italy: Phytopathological Notes, *p.* 1006. — Serb, Croat and Slovene State: A New Insect Pest in Dalmatia, *p.* 1006. — Switzerland: Plant Pests in Ticino, during the second quarter of 1927, *p.* 1006.

- VARIOUS QUESTIONS RELATING TO PLANT PROTECTION IN THE DIFFERENT COUNTRIES. — Algeria : Swarms in Flight and Breeding Places of *Dociostaurus maroccanus* during the Month of July, 1927, *p.* 1007. — Guadeloupe : Crop Pests and Diseases, *p.* 1007. — Syria : Experiments on Locust Destruction, *p.* 1010
- LEGISLATIVE AND ADMINISTRATIVE MEASURES. — Tyrol (Austria), *p.* 1012. — Scotland, *p.* 1013 — France, *p.* 1014. — Italy, *p.* 1015.
- RECENT BIBLIOGRAPHY, *p.* 1016.
- NOTES. — The First German High Institute for Plant Diseases, *p.* 1020.

STATISTICS.

- CROP PROSPECTS AND ESTIMATES, *p.* 1021
- PRODUCTION OF CEREALS, *p.* 1025
- INTERNATIONAL TRADE, *p.* 1027
- PRICES OF WHEAT, MAIZE AND COTTON, *p.* 1030

AGRICULTURAL LEGISLATION

- SUMMARY OF NEW LAWS AND REGULATIONS, *p.* 1034.

AGRICULTURAL ASSOCIATIONS

- GENERAL NOTICES. Austria *p.* 1041 — Italy, *p.* 1042.

CURRENT NOTICES

- AGRICULTURAL INSTRUCTION AND EXPERIMENT. — Scientific Research on Tobacco Growing in Australia, *p.* 1043
- AGRICULTURAL AND SCIENTIFIC ASSOCIATIONS AND INSTITUTIONS. — Research at the Brooklyn Botanic Garden, New York, *p.* 1043.
- CONGRESSES AND CONFERENCES — Irrigation Congress and Cotton Day. Algiers, first Fortnight of October 1927, *p.* 1044 — Conference on the Fermentation and Alimentation Industries Ghent, 24-25 September, 1927, *p.* 1044
- EXHIBITIONS, FAIRS, COMPETITIONS — Wine Press Machinery Competition Use. Alcazar de San Juan (Ciudad Real), Spain, 3-9 October 1927, *p.* 1045
- MISCELLANEOUS. — Wild Edible Plants, *p.* 1045.
- JOURNALS AND REVIEWS — The Journal of the Central Bureau of Animal Husbandry and Dairying in India, *p.* 1045.

NOTES ON THE INTERNATIONAL INSTITUTE OF AGRICULTURE.

- The Institute and the IIIrd International Congress of Scientific Management, *p.* 1046 — World Agricultural Census, 1930, *p.* 1046. — Forestry,

p. 1046. — Wool Congress at Biella, *p.* 1046 — Meeting of the International Scientific Council and of the Permanent Commission of Agricultural Associations, *p.* 1047 — Congress of the International Chamber of Commerce at Stockholm, *p.* 1048 — International Country Life Congress (East Lansing, Mich., U S A, 4-6 August 1927), *p.* 1048

RECEIVED BY THE LIBRARY, *p.* 1050

INTERNATIONAL REVIEW OF AGRICULTURE

PUBLISHED

BY THE

INTERNATIONAL INSTITUTE OF AGRICULTURE



New Series

XVIIIth Year — No. 9. — October, 1927.

ROME

PRINTING OFFICE OF THE INTERNATIONAL INSTITUTE OF AGRICULTURE

—
1927

= ECONOMIC AND SOCIAL
QUESTIONS—SCIENCE AND
PRACTICE OF AGRICUL-
TURE - SYLVICULTURE -
PLANT PROTECTION - STA-
TISTICAL NOTES - AGRI-
CULTURAL LEGISLATION -
AGRICULTURAL ASSOCIA-
TIONS—CURRENT NOTICES
- NOTES ON THE INTER-
NATIONAL INSTITUTE OF
AGRICULTURE - LIBRARY
ACQUISITIONS

CONTENTS

ECONOMIC AND SOCIAL QUESTIONS.

- CO-OPERATION AND ASSOCIATION. — The Canadian Wheat Pools, *p.* 1053. — Danish Agricultural Co-operation in 1926, *p.* 1059.
- CREDIT. — Establishment of Native Reserve (ejidales) Agricultural Banks in Mexico, *p.* 1063.
- LAND SYSTEMS. — Settlement of Waste Lands in Colombia, *p.* 1066. — Land Settlement Schemes in the U. S. S. R., *p.* 1067.
- MARKETING OF AGRICULTURAL PRODUCE. — The Publication of Index Numbers of Agricultural Products and Costs of Production for England and Wales, *p.* 1073. — Currant Trade in Greece, *p.* 1075
- FARM ECONOMICS. — The Condition of Agriculture in the Province of Friesland (Netherlands), *p.* 1080.

THE SCIENCE AND PRACTICE OF AGRICULTURE.

- GENERAL AGRONOMY AND TEMPERATE CLIMATE CROPS — Effect of Cropping on the Nitrogen and Organic Carbon of Irrigated Soils, *p.* 1085. — Potash Mines in Catalonia, Spain, *p.* 1086 — Recent Developments in the Preparation and Use of Concentrated Fertilisers, *p.* 1086 — Value as a Fertilizer of Solubilized Leather Waste, *p.* 1087. — Heat Fermentation of Pen Manure, *p.* 1087. — Action of Ammonium Chloride on Plants, *p.* 1088. — Development of Japanese Trade in Superphosphates, *p.* 1088. — The Inter-Relation between Silicon and other Elements in Plant Nutrition, *p.* 1089. — Unusual Appearance of a Smooth-awned Barley in Morocco, *p.* 1090. — The Inheritance of Length of Style in Buckwheat, *p.* 1090. — Self-Fertilization in Buckwheat, *p.* 1090. — Relation between Fruit Size and Abscission of Young Orange Fruits, *p.* 1091. — Influence of Size of Seed-grain on Crop, *p.* 1091. — Maize Trials at Salisbury, Rhodesia, *p.* 1092. — Use of the Juice of Prickly Pear in Copper Salt Sprays, *p.* 1093. — Distribution of Sugar in Different Shaped Species of Beets, *p.* 1094 — Composition of Honeydews, *p.* 1097. — Factors producing Mottling in Soya Beans, *p.* 1099. — Summer and Winter Fallowing Competitions in Victoria, *p.* 1100. — Birds'-foot Trefoil, *p.* 1101. — Harvesting Fodder Crops, Use of Driers, *p.* 1102. — Losses in Silage-Making at the Albert Agricultural College, Ireland, *p.* 1102.

- TROPICAL AGRICULTURE.** — Mould on Rubber, *p.* 1104. — Preliminary Report on Tapioca Varieties grown at the Government Plantation, Serdang, *p.* 1104 — On the Occurrence of Hydrogen Cyanide in *Hevea*, *p.* 1103. — The Separation of "Kernels" and Shells in the Oil Palm Industry, *p.* 1106. — The Germination of Tobacco Seeds in Solutions of different Hydrogen-ion-concentration, *p.* 1106. — The Shrinkage of Deli Tobacco during Drying, *p.* 1106. — Composition of the Java Sugar Cane Fields in 1927, *p.* 1106. — Soil Reaction and Growth of Sugar Cane in Java, *p.* 1107.
- AGRICULTURAL ENGINEERING.** — Irrigation in Relation to Soil Moisture and Plant Growth, *p.* 1108. — Geffroy Stone Gatherer, *p.* 1110. — The Renault Soil Drilling Machine, *p.* 1111. — The Use of Combines or Harvester-Threshers in certain States of the U. S. A., *p.* 1111. — The "Zybach" Tractor Guide, *p.* 1113. — New Hay Loader, *p.* 1114
- ANIMAL HUSBANDRY** — Variations in the Number of Erythrocytes and Leucocytes in the Horse resulting from Work, *p.* 1115. — Progress of Animal Husbandry in Spain, *p.* 1116. — Goats and Sheep of the African Centre, *p.* 1116. — Possible Connection of Chemical Composition of Pastures with Mortality among Lambs in Central Otago, N. Z. *p.* 1118 — Sheep Hand Feeding Trials in Victoria, *p.* 1119
- AGRICULTURAL INDUSTRIES** — Use of Skim-Milk for Bread Making, *p.* 1121 — The α and β Glutelins of Wheat (*Triticum vulgare*), *p.* 1122 — Remarks on Oil of Grape Stones, *p.* 1122 — The Advantage of the Preparation of Aseptic Wines of moderate Alcohol Content preserved by Refrigeration, *p.* 1123 — The Determination of Casein in Milk by an approximately iso-electric Precipitation, *p.* 1123 — Modification of the Water-glass Method of Preserving Eggs, *p.* 1124.

SYLVICULTURE.

- Scientific Organization of Labour in Forestry Industries.** Considerations on the Timber Industry in Yugoslavia, *p.* 1125 — A new Western Birch, *p.* 1127 — Forestry in Tripolitania, *p.* 1127. — Progress Report on Forestry Administration in the Punjab for the year 1924-25, *p.* 1128. — Forestry in Kenya in 1925, *p.* 1130. — Formation and Regeneration of Forest in the Central Provinces of India, *p.* 1131.

PLANT PROTECTION.

- DISCOVERIES AND CURRENT EVENTS IN WORLD PHYTOPATHOLOGY.** — Algeria: *Polychrosis botrana* in the Mitidja Plain, *p.* 1133. — Belgian Congo: Diseases and Pests new to the Colony, *p.* 1133. — Italy: Phytopathological Notes, *p.* 1134. — Holland: Blue Coloration in Potato Tubers, *p.* 1134.
- VARIOUS QUESTIONS RELATING TO PLANT PROTECTION IN THE DIFFERENT COUNTRIES.** — French Equatorial Africa: Cotton Pests and Diseases noted recently in the Chari Basin, *p.* 1135. — Scotland: Notes on Plant Diseases and Pests, *p.* 1136. — West Indies: Notes on the Prevalence of Insect

INTERNATIONAL REVIEW OF AGRICULTURE

PUBLISHED

BY THE

INTERNATIONAL INSTITUTE OF AGRICULTURE



New Series

XVIIIth Year — No. 10. — November, 1927.

ROME

PRINTING OFFICE OF THE INTERNATIONAL INSTITUTE OF AGRICULTURE

1927

= ECONOMIC AND SOCIAL
QUESTIONS—SCIENCE AND
PRACTICE OF AGRICUL-
TURE — SYLVICULTURE —
PLANT PROTECTION —STA-
TISTICAL NOTES — AGRI-
CULTURAL LEGISLATION —
AGRICULTURAL ASSOCIA-
TIONS—CURRENT NOTICES
— NOTES ON THE INTER-
NATIONAL INSTITUTE OF
AGRICULTURE — LIBRARY
ACQUISITIONS

CONTENTS

ECONOMIC AND SOCIAL QUESTIONS

- CREDIT — A Suggested Credit Scheme for English Farmers, *p* 1181 — Reorganisation of the Agricultural Credit Department of the Bank of the Republic of Uruguay, *p* 1182
- MARKETING OF AGRICULTURAL PRODUCE — The Organisation of the Milan Fruit and Vegetable Market and of the Centres of Supply, *p* 1184.
- FARM ECONOMICS — The Condition of Peasant Farms in the U. S. S. R. as shown by a Study of their Accounts, *p* 1189.

THE SCIENCE AND PRACTICE OF AGRICULTURE

- GENERAL AGRONOMY AND TEMPERATE CLIMATE CROPS — On the Question of the Influence of Geographical Factors on the Hulledness of Barleys, *p* 1197 — Determination of Soil Reaction with the Merck Universal Indicator, *p* 1198 — The Action of Sulphuric Acid on Cultivated Soil, *p* 1199 — Nitrogenous Fertilizers in Italy, *p* 1200 — Manurial Experiments with Potassium Nitrate, *p* 1209 — High Yield Wheats in the South West of France, *p* 1201 — Time of Cutting Wheat and Oats in Relation to Yield and Composition, *p* 1202 — Maize and the Necessity for Crop Rotation, *p* 1203 — *Trifolium subterraneum*: its Spread in Australia, *p* 1204 — The Effects of Spacing on the Composition of Sugar Beets, *p* 1205 — Potash and Ammonia Salts on Mangels and Potatoes at Woburn Experimental Station, 1926, *p* 1206 — Manuring of Early Potatoes in New Zealand, *p* 1207. — Tomato Growing in the Neighbourhood of Sydney, N. S. Wales, *p* 1207 — The Manuring of Tomatoes in England, *p* 1209 — Composition of the Fruits of *Asimina triloba* Dunal, *p* 1210. — The Cultivation of *Phormium*, a new Fibre Plant, in Argentina, *p* 1210.
- TROPICAL AGRICULTURE. — Native Coffee growing in the southern Toradjalands (Celebes), *p* 1212. — Physiological Experiments on the Germination of Coffee Seeds, *p* 1212. — The Production of Tea in Tonkin, *p* 1213 — The Sugar Production of Java in 1926, *p* 1214 — The Origin of Tobacco and the Beginnings of its Cultivation, *p* 1215 — Direct Use of Latex, *p* 1216.

- AGRICULTURAL ENGINEERING. — Standardization of Agricultural Machinery and Implements, *p.* 1217. — Suction Gas Tractor Trials in England, *p.* 1218. — Stable Manure Transporter, *p.* 1220. — A Rapid Process for Stubble Sowing, *p.* 1221. — The "Rapid" Reaper, *p.* 1222.
- ANIMAL HUSBANDRY. — Cod Liver Oil as Food. Observations on the Existence of Vitamin E, *p.* 1223. — Number of Animals necessary in Feeding Experiments for the Elimination of Individual Influences, *p.* 1223. — Digestibility and Feeding Value of Corn Stover (Maize) Silage, *p.* 1224. — Feeding Tests regarding the Nutritive Value of an oily Ground-nut Bran, *p.* 1225. — Test of Hydrocyanic Acid in Cattle Cake, *p.* 1226. — Minimum Mineral Requirements in Cattle, *p.* 1226. — Influence of Horsetail (*Equisetum Palustre*) on Milk and its Fat Content, *p.* 1228. — Trial of the Application of the 6-5-8 Method for Determining Milk Yield, *p.* 1229. — Kemp as a serious Defect in Wool, *p.* 1229. — The "Churra" Sheep of Spain, *p.* 1230. — Function of Small Stones in Poultry Nutrition, *p.* 1231.
- AGRICULTURAL INDUSTRIES. — The Composition of Flaked Maize, *p.* 1232. — Drying of Sugar Beet Crowns. Desiccators for Agricultural Use, *p.* 1232. — Carbon Dioxide as a Substitute for Ordinary Ice *p.* 1233 — Certain By-Products from the Sugar Industry, their Production and Use in South Africa, *p.* 1235. — The Manufacture of Cheap Packing Materials, *p.* 1235 — Cool Storage of "Valencia Late" Oranges in Victoria, *p.* 1236. — Effect on Wine of Aluminium Utensils, *p.* 1237. — Industrial Utilization of Vine Prunings, *p.* 1238.

SYLVICULTURE

- Methods of Weed Control in Forest Nurseries, *p.* 1240. — The Hydrological Function of the non-teak Forests in Java, *p.* 1242. — The Influence of the Competition of the Roots of Shade Trees on the Growth of Young Plants, *p.* 1242 — Some Notes on *Picea Omorica* Panic, *p.* 1243

PLANT PROTECTION

- DISCOVERIES AND CURRENT EVENTS IN WORLD PHYTOPATHOLOGY — *Canada*: Heterothallism and Mutation in Rust Fungi, *p.* 1261. — *Egypt*: Locust Invasion, *p.* 1262. — *Palestine*: Short Observations concerning some recently discovered or little known Plantation Pests, *p.* 1262. — *Dominican Republic*: Specialization of *Albugo* on *Ipomoea*, *p.* 1264.
- VARIOUS QUESTIONS RELATING TO PLANT PROTECTION IN THE DIFFERENT COUNTRIES. — *New Zealand*: Activities in Field of Plant Pathology in 1927, *p.* 1265.
- LEGISLATIVE AND ADMINISTRATIVE MEASURES — *Brazil*, *p.* 1266. — *Belgian Congo*, *p.* 1266 — *Italy*, *p.* 1267. — *Mexico*, *p.* 1268.
- RECENT BIBLIOGRAPHY, *p.* 1272.
- NOTES — Establishment of a New Entomological Station in Switzerland, *p.* 1276.

STATISTICS

- CROP PROSPECTS AND ESTIMATES, *p.* 1261-*a.*
 INTERNATIONAL TRADE, *p.* 1268-*a.*
 PRICES OF WHEAT, MAIZE AND COTTON, *p.* 1271-*a.*

AGRICULTURAL LEGISLATION

- SUMMARY OF NEW LAWS AND REGULATIONS, *p.* 1275-*a.*

AGRICULTURAL ASSOCIATIONS

- GENERAL NOTICES. — Guatemala, *p.* 1279.

CURRENT NOTICES

- AGRICULTURAL INSTRUCTION AND EXPERIMENT. — A New Institute for Plant Genetic Research in Berlin, *p.* 1281. — A New Technical Process for the Preservation of the Characteristic and Natural Aspect of Plant and Animal Specimens, *p.* 1281. — An American Institute of Baking, *p.* 1281. — Yearly Free Courses in Paris on Agricultural Credit Schemes and Co-operation, *p.* 1282. — Courses on Tobacco Culture in Italy, *p.* 1282. — Agricultural and Animal Husbandry Research Organization in Japan, *p.* 1282.
- AGRICULTURAL AND SCIENTIFIC INSTITUTIONS AND ASSOCIATIONS. — An Organization for the Export of Cereals from the States of South Eastern Europe, *p.* 1283. — Agricultural Associations in the Republic of Salvador, *p.* 1283.
- CONGRESSES AND CONFERENCE. — International Emigration Conference, Havana, March 1928, *p.* 1283. — Colombian Coffee Planters' Congress, Colombia, July 1927, *p.* 1284. — Ist Congress on Milk Products, Havana, Cuba, April 1927, *p.* 1284. — XVth Congress on Agricultural Mutual Credit and Corporation, Metz, France, 30 June-3 July 1927, *p.* 1284. — Annual Wheat Trade Meetings, Lille, France, *p.* 1285. — IVth North African Conference, Algiers, May, 1927, *p.* 1285. — Agricultural Conference, Kenya, Nairobi, August 1926, *p.* 1285. — Meetings of the Fascist Agricultural Associations, Rome, 8-10 October 1927, *p.* 1285. — IXth Congress of Italian Beekeepers, Trento, 26-29 August 1927, *p.* 1286. — Ist National Congress regarding Accidents to Agricultural Workers, Vercelli, 24-26 September 1927, *p.* 1286.
- EXHIBITIONS, FAIRS AND COMPETITIONS. — Vine Week at Tunis in April 1928, *p.* 1286. — IInd International Fair, Salonica, 18 September-3 October 1927, *p.* 1286. — Animal Husbandry Exhibition, Como, Italy, 5-6 September 1927, *p.* 1286. — Wool Industry Exhibition, Biella, Italy, September 1927, *p.* 1287. — Agricultural Exhibition, Turin, 1928, *p.* 1287.

NOTES ON THE INTERNATIONAL INSTITUTE OF AGRICULTURE

Nomination of Delegates, *p.* 1288. — Vth International Seed Testing Congress, *p.* 1288. — Representation of the Institute at Conferences and Congresses, *p.* 1288. — International Agricultural Film Collection, *p.* 1288 — Imperial Agricultural Research Conference, London, *p.* 1288. — Meetings of the International Scientific Agricultural Council and of the Permanent International Committee of Agricultural Associations, *p.* 1289. Personnel of the Bureaux of the Institute, *p.* 1289. — World Agricultural Census of 1930, *p.* 1290.

RECEIVED BY THE LIBRARY, *p.* 1291.

INTERNATIONAL REVIEW OF AGRICULTURE

PUBLISHED

BY THE

INTERNATIONAL INSTITUTE OF AGRICULTURE



New Series

XVIIIth Year — No. 11. — December, 1927.

ROME

PRINTING OFFICE OF THE INTERNATIONAL INSTITUTE OF AGRICULTURE

1927

= ECONOMIC AND SOCIAL
QUESTIONS—SCIENCE AND
PRACTICE OF AGRICUL-
TURE — SYLVICULTURE —
PLANT PROTECTION — STA-
TISTICAL NOTES — AGRI-
CULTURAL LEGISLATION —
AGRICULTURAL ASSOCIA-
TIONS—CURRENT NOTICES
— NOTES ON THE INTER-
NATIONAL INSTITUTE OF
AGRICULTURE — LIBRARY
ACQUISITIONS

CONTENTS

ECONOMIC AND SOCIAL QUESTIONS

- CO-OPERATION AND ASSOCIATION. — Co-operative Cotton Marketing in the United States *p.* 1293.
- ECONOMIC AND SOCIAL CONDITIONS OF THE AGRICULTURAL CLASSES. — Emigration and Labour in the Dutch East Indies, *p.* 1303.
- MARKETING OF AGRICULTURAL PRODUCE — Recent Marketing Legislation and the Activities of Cotton-Growers in Queensland, *p.* 1305. — A New Proposal for Cattle Farming in South Africa, *p.* 1306.

THE SCIENCE AND PRACTICE OF AGRICULTURE

- GENERAL AGRONOMY AND TEMPERATE CLIMATE CROPS — A Source of Soil Humidity, *p.* 1309. — "Rain" Watering as a Help to Rural Settlement in Germany, *p.* 1309. — The Sulphur Content in certain Cultivated Soils, *p.* 1311. — The Use of Collodion Sacks in obtaining Clear Soil Extracts for the Determination of the Water-Soluble Constituents, *p.* 1312. — Determination of Organic Matter in Soils by Means of Hydrogen Peroxide, *p.* 1312. — Use of Distillery Residues for Preparation of Artificial Manure, *p.* 1313. — Silage Crop and other Trials at Salisbury, Rhodesia, *p.* 1313. — The Effect of Sub-Optimal Water Content on Plants during the Various Growth Phases, *p.* 1314. — New Investigations on the Assimilation of Biogenous Elements by the Roots of Agricultural Plants, *p.* 1316. — Investigations on the Lesion Hormones of Plants, *p.* 1318. — Wet or Dry Pre-treatment of Seed, *p.* 1319. — Influence of Desiccation and Moistening of the Soil at different Stages of Vegetation on the Growth and Yield of Cereals, *p.* 1320. — The Storage of Mineral Matters, of Total and Protein Nitrogen and of Starch during the Ripening of different Wheats, *p.* 1321. — Increase of the Dry Matter Content in the Grains of Different Spring Wheats and the Utilization of Undeveloped Grain as Seed, *p.* 1322. — Improvement of Cultivated Wheats in Cold Districts of France, *p.* 1324. — Improvement of Winter Oats, *p.* 1325. — Types of *Beta* 1, species, *p.* 1326. — Ethylene Chlorohydrin Treatment for Delayed Dormancy in Potatoes, *p.* 1326. — Meadow Hay in Districts of Western Australia with a Rainfall of 20-30", *p.* 1327. — *Paspalum dilatatum* (Poiré), a Useful Permanent Pasture Plant, *p.* 1328. — Timber and Fuel for Tobacco Growers in Southern Rhodesia, *p.* 1328. — Cotton-growing in Spain,

p. 1329. — Production of Esparto grass in Spain, *p.* 1329. — Approval of Vine Cuttings, etc., in Germany, *p.* 1330.

TROPICAL AGRICULTURE. — Analysis of Phosphatic Manures used on Tea Soils, *p.* 1331. — Quantity of Irrigation Water used by native Farmers in the Residency of Soerabaja, *p.* 1332. — The POJ 2725 Sugar-cane in Argentina, *p.* 1332. — Cultivation of Sugar-cane in Peru, *p.* 1333. — Researches on the Physiological Function of Latex, *p.* 1335. — Investigation on the Occurrence of Fissures in the Interior of the Hevea-bark, *p.* 1335. — Weighing of Sole-Crepe for controlling the Uniformity in Thickness, *p.* 1336.

AGRICULTURAL ENGINEERING. — Electro-Farming in Scotland, *p.* 1337. — A Combined Seed Disinfectant and Drill, *p.* 1338. — The Effect of Growth upon the Capacity of Drainage Ditches, *p.* 1339.

ANIMAL HUSBANDRY. — Advantage of Railway Transport for Animals sent to Fattening Centres in Brazil, *p.* 1340. — Effects of Acute and Chronic Inanition on the Functions of the Testicle and the Ovary, *p.* 1340. — The Computed as Compared with the Directly Observed Fasting Katabolism of Cattle as a Measure of the Maintenance of Energy, *p.* 1342. — Chemical Method of Castration, *p.* 1343. — The Influence of the Age of the Cow on the Yield and Quality of the Milk, *p.* 1343. — Relation between the Udder Capacity of Dairy Cows and Milk Yield, *p.* 1344. — Composition of Milk towards the End of Lactation, *p.* 1345. — Critical Tests of Tetrachlorethylene as an Anthelmintic for Foxes, *p.* 1346.

AGRICULTURAL INDUSTRIES. — Wine and the Wine Lands of the World, *p.* 1347. — Analysis of Cider and Wine in Ultra violet Light, *p.* 1347. — The Manufacture of natural Fruit Juice Cordials, *p.* 1347. — Some Variations of the Heat Method for Sterilizing Milking Machines, *p.* 1348. — Fleischmann's Formula for the Determination of Dry Matter Content in Milk corroborated by a Mathematical Method, *p.* 1348. — Systematic Researches on Frost's Method (small cultures on object glasses) for Counting Living Bacteria in Milk, *p.* 1349. — Extraction of Oil by a centrifugal Method, *p.* 1351. — Baskets for Oil Mills, *p.* 1351.

SYLVICULTURE

Forestry in British Honduras in 1925-26, *p.* 1352. — The Forests of Cyprus, *p.* 1353. — Forestry in Coorg during 1925-26, *p.* 1355.

PLANT PROTECTION

DISCOVERIES AND CURRENT EVENTS IN WORLD PHYTOPATHOLOGY. — Belgian Congo: A New Disease of the Oil Palm (*Elaeis guineensis*), *p.* 1357. — Greece: Bacterial Diseases of Tobacco in connection with *Gnorimoschema heliopa* in Thessaly, *p.* 1357. — Kingdom of the Serbs, Croats and Slovenes: Some less known Insects causing Damage in Dalmatia, *p.* 1358.

VARIOUS QUESTIONS RELATING TO PLANT PROTECTION IN THE DIFFERENT COUNTRIES. — Algeria: Flights of Locusts during the Month of October

- 1927, *p* 1359 — Fiji: Entomological Notes, *p*. 1360 — Sierra Leone. Experiments on Ginger Scale, *p* 1360
- LEGISLATIVE AND ADMINISTRATIVE MEASURES — Germany (Reich), *p* 1361 — Germany (Prussia), *p*. 1361 — Germany (Thuringen), *p* 1361. — Austria (Vienna), *p*. 1362 — Canada, *p* 1362 — United States of America (Florida), *p* 1363 — France, *p* 1365 — Italy, *p* 1367
- RECENT BIBLIOGRAPHY, *p* 1367
- NOTES. — An Entomological School ("Seminar") at Rostock, Germany, *p* 1372

STATISTICS

- CROP ESTIMATES, *p* 1373
- INTERNATIONAL TRADE, *p* 1381
- PRICES OF WHEAT, MAIZE AND COTTON, *p* 1384

AGRICULTURAL LEGISLATION

- SUMMARY OF NEW LAWS AND REGULATIONS, *p* 1388.

AGRICULTURAL ASSOCIATIONS

- GENERAL NOTICES — Hungary, *p* 1393
- CURRENT NOTES — France, *p* 1394

CURRENT NOTICES

- AGRICULTURAL AND SCIENTIFIC INSTITUTIONS AND ASSOCIATIONS — Poultry Service in Canada (Quebec Province), *p* 1395 — Establishment of Olive Associations (*Consorzi*) in Italy, *p* 1395
- CONGRESSES AND CONFERENCES — British Empire Agricultural Research Conference, London, October 1927, *p* 1396
- CENTRAL NOTICES — Schemes for Irrigation Works in Mexico, *p* 1398 — Poland and the International Corn Market, *p* 1398 — A Five Year Programme for the Development of the Sugar Industry in Russia, *p* 1399 — Important Irrigation Schemes for Armenia, *p* 1399 — Unsuccessful Attempts to discover Potash Beds in Switzerland, *p* 1399 — The Dairy Industry in Moravia, *p* 1400

NOTES ON THE INTERNATIONAL INSTITUTE OF AGRICULTURE

- International Scientific Council and Permanent Commission of Agricultural Associations, *p* 1401 — Permanent Committee, *p* 1405
- RECEIVED BY THE LIBRARY, *p*. 1403

ECONOMIC AND SOCIAL QUESTIONS

CO-OPERATION AND ASSOCIATION

Scope and Work of the Argentine Agricultural Federation.

Federazione Agraria Argentina. Rosario (Santa Fé).

The Argentine Agricultural Federation originated in 1912 at Rosario (Santa Fé) as a vocational association between tenant farmers of lands in the provinces of Buenos Aires, Santa Fé and Cordoba, where about 90,000 tenants were settled representing nearly three-fourths of the Argentine farmers. When first formed its object was to make a stand against the abusive practices of the landowners and intermediaries in regard to the clauses in the letting agreements of farms; in fact it began with a strike of tenants which resulted in obtaining some reduction in rents. Its most important function however was to establish on sound moral principles a union of genuine agriculturists, or settlers, and to carry on the class conflict methodically and particularly by training in solidarity and mutual aid.

First attention was given to the material interests of the members and mutual insurance against fire was arranged so as to save the settlers from having recourse to the ordinary insurance societies. A special Office was also organised for the defence of members in the law courts.

Subsequently provision was made for training in general principles by means of pamphlets and conferences and steps were taken to induce Parliament to pass a law for the protection of the peasants.

At the present time the membership consists of 19,321 agriculturists, including 4,610 Argentines, half the number being sons of Italians, 9,381 Italians, 3,130 Spaniards, 733 Slavs, 156 Germans, 384 French. The members are cultivating in all about 23,000,000 hectares, mainly in cereals.

The primary object of the association is to transform the settler into an owner, and meantime to organise every form of co-operation which is likely to make him independent of intermediaries; to arrange for the legal and general protection of members, to make collective agreements, and to effect material protection by means of insurance against hail and accidents in work.

As the trade in articles of food and clothing for workers on the land in Argentina and also in farm requisites is all in the hands of a few importing and distributing firms, the Federation has opened depots in different towns for the purchase of goods required by settlers and for the sale of the cereals produced by members.

The success of the Federation is already very striking, and is growing, as is also that of the co-operative societies organised by the Federation.

The most valuable and successful work of the Federation has been that of insisting on the observance of principles of equity and justice in farming agreements with the owners.

After a prolonged struggle and a keen propaganda carried on by means of the press and petitions to Parliament, the Federation has been able to get a law passed on letting agreements which can be used to combat the political and economic power of the owners of the large estates. It subsequently succeeded in presenting to Parliament the well known bill on home colonisation, based on expropriation of the large estates nearest the great lines of communication, a bill which it is probable will one day become a fundamental law of the Republic. Meanwhile the law on farming contracts regulates equitably the giving of notice, limits sub-letting, regulates the right of the tenant to build a house, a store house, a barn, a silo for cereals or forage and a drinking trough, gives him the right to plant five fruit trees or timber trees per hectare, up to a maximum of 500, and indicates various other improvements for which compensation is to be paid on the expiry of the tenancy. In addition it forbids certain of the customary clauses of the old contracts and specifies the furniture, implements, animals, etc., belonging to the tenant upon which distress cannot be levied.

Care is taken by the Federation to ensure the observance of these provisions and to prevent the re-appearance of the abuses which were formerly prevalent.

Co-operative Fruit-growing Societies in Argentina.

La Tierra, Nos. 1245 and 1247 Rosario de Santa Fé, 1 and 3 February 1927.

There has been a considerable development of co-operative societies of fruit growers and dealers in the most important agricultural regions of the Republic. The Federal Government has encouraged the formation of these societies, the Ministry of Agriculture has carried out propaganda on their behalf and they have enjoyed the valuable and continuous support of the Argentine Federation.

The societies of sellers (*tamberos*) formed throughout the Buenos Aires territory take various forms.

The fruit growers who are combined into groups in the Delta of the Paraná, at Dolores, and in the extreme south of Buenos Aires are already very active in the islands of the Delta, the neighbourhood of the capital being a distinct advantage.

The port of S. Ferdinando, the recently established fruit market of

Tigre, the Consortium of Paraná Miní, organised by the Office for Regional Scientific Agriculture, and the agreement with the Council of Supplies of Buenos Aires, have all contributed to the success of the movement for co-operative fruitgrowing.

It is also realised that fruitgrowing in Argentina provides an opportunity for extending co-operative marketing across the whole Republic and bringing the temperate and the tropical regions into communication.

The *Centro Unión Chacareros* of Mendoza has recently established in Mendoza itself the beginnings of a provision market as a corporate body with municipal privileges, as approved by a recent decree.

Subscriptions have been opened by the Spanish Bank and the River Plate Bank for two series of shares, each of the total amount of 200,000 pesos, the shares being of the nominal value of 50 pesos.

The municipal concession is for 25 years, during which the only tax will be the sum of 50,000 pesos a year, payable in quarterly instalments.

The minimum capital to be laid out by the *Centro Unión Chacareros* is 250,000 pesos.

In addition to fruit, the market will sell both wholesale and retail, pulse, vegetables, meat and other products.

Many fruitgrowers belonging to the *Centro Unión Chacareros* are in permanent contact with the National Agricultural Federation of Argentina which is extending its operations to Entre Rios, Santiago del Estero and Chaco, and supplying the societies of Santa Fé, Buenos Aires, Pampa and Rio Negro, the object being to find a national solution of the problem of fruit-growing, in relation to the market in Argentina and elsewhere.

The Social and Economic Work of the Belgian "Boerenbond".

Assemblée générale du *Boerenbond* belge *Le Paysan*, No 24, Louvain, 1 June 1927.

Under the guidance of its Higher Council the work of the *Boerenbond*, which at the end of 1926 included 1,174 local guilds with 112,686 members, becomes every year more strongly developed both in the social and in the economic field. While its economic activities take the usual forms, there is a constant stimulus to new and various social activities which is due to the real desire that is felt for the moral, religious and cultural training of the members. One of these movements, which seems assured of success, is the organisation of young persons in country districts, the intention of which is to provide the sons of members with opportunities of instruction and wholesome recreation. The organisation consists of 296 sections and there are more than 10,000 members on the books. Special short courses (*journées d'étude*) were attended by more than 500 members. Particular attention is given to vocational instruction and education, and with this object 4,780 lectures were given on various subjects and a number of leaflets issued. As many as 260 vocational continuation classes were held. A distinct impetus to training in the technique of agriculture was given by crop and live stock competitions and by agricultural and horticultural shows. The number of rural libraries has increased to 212.

The Legal Department has given 1,329 free consultations, and the Seed Selection Department has also been very active, while 114 local unions were registered in connection with the Live Stock Improvement Service. The General Federation of Horticulturists organised two educational journeys, and 293 horticultural lectures. Special attention was paid to the control of plant diseases and insect pests. At the end of the year under review, the Farmwomen's League (*Ligue des Fermières*) included 695 clubs with 72,803 members. The following is a summary of its work : 3,530 meetings of local clubs were held ; 210 courses were given on subjects of special interest for the mother of the family, the farm housewife and the woman agricultural labourer and 130 meetings were held for managers of clubs ; assistance was given in the organisation of 99 courses in rural household management ; 62 juvenile sections were formed in clubs and five short courses for young people were held and were attended by over 4,000 farmers' daughters.

At the Dairy Inspection Office 168 co-operative dairies were registered and 311 visits were made to inquire into the technical management of the dairies and their accounting methods.

A General Inspection Service supervises the work of all the local associations affiliated to the *Boerenbond*, the numbers of which have been recently increased by the accession of 192 unions of sugar beet growers.

Mention should also be made of the Technical Service which includes sections dealing with rural buildings, electricity and land drainage. The Land Drainage Section is preparing a scheme for the formation of 9 *wateringues*, or drainage associations, to deal with a total area of 4,800 hectares of low lying land. The *wateringue* of Exaerde is already in working order, and has carried out drainage operations over an area of 240 hectares. Plans for dwelling houses, farms, and dairies have been made by the Buildings Section.

The main economic activities, properly so-called, are those connected with co-operation for purchase and sale, agricultural credit and insurance. The *Comptoir d'Achat et de Vente* purchased in 1926 for members 263,671,000 kg. of chemical fertilisers, stock feeds and other raw materials, for a total value of 194,450,000 francs. It supplied seed grain, potato slips, seeds of vegetables and forage plants, dairy equipment and farm machines, for a total value of 7,210,000 francs. The Mervem mill is already in full working while two other mills have been installed at Brée and Bruges. The *Comptoir* also sold on members' account 21,307,000 kg. of potatoes. The co-operative sale of butter amounted to 282,727 kg., realising 5,898,000 francs and 14,454,000 fresh eggs were sold for a sum of 11,564,000 francs. Joint sales of vegetables realised 634,700 francs, and 391,000 kg. of fruit were sold for 359,000 francs.

The number of rural banks affiliated to the *Caisse Centrale de Crédit*, at the end of 1926, was 970 ; the guarantee capital amounted to 75,581,000 francs, and the total of deposits to 752,829,000 francs. During the year, 125 new credits were opened for a total of 8,887,000 francs and 244 mortgage loans were arranged for a total of 7,026,000 francs. On 31 December 1926, the savings deposits accepted by the affiliated banks since their formation

amounted to 1,235,000,000 francs, and 86,286 loans had been made for a sum total of 350,407,000 francs.

The *Société d'Assurance du Boerenbond Belge* carries out fire and life insurance, and insurance against accidents during work. At the end of the year the number of fire insurance policies was 82,751; values insured amounted to 3,864,000 francs and premiums collected to 7,170,000 francs. The number of lives insured was 1,119, for a capital sum of 25,409,000 francs and the premiums paid reached a total of 1,747,000 francs. The accident insurance business will completely engage the two already existing societies, the *Caisse Commune d'Assurance des Cultivateurs Belges* with 11,121 policies, and the *Assurance Agricole* with 40,027 policies. The premiums, taking both together, amounted to 7,052,000 francs.

The *Société Belge de Défrichements* has made land improvements on an area of over 400 hectares and has supplied nearly 200,000 different trees and shrubs.

The Co-operative Marketing of Dark Tobacco in the United States.

GATLIN, Geo. O.: Co-operative Marketing in the Black Patch. *Co-operative Marketing Journal*, Vol. I, No. 3 Washington, February 1927. — *Oklahoma Cotton Grower*, Vol. VII, No. 5. Oklahoma City, 10 March 1927.

The story of co-operative marketing in the so-called Black Patch is a stirring one. The Black Patch is the name given to a district comprising a number of counties in the western ends of Kentucky and Tennessee. The name is derived from the dark fire-cured export tobacco that grows so well on its heavy silt and clay loam soils. In recent times the name has been extended to include all those parts of Kentucky and Tennessee in which dark tobacco is grown.

In pioneer days growers sent their crops by boat to New Orleans for shipment abroad. After about 1833 they "prized", or packed under pressure, their tobacco in hog-heads and consigned these to commission warehouses that had been established in various markets. For many years this system seems to have been satisfactory, but abuses began to occur and eventually became frequent. About 1873 the members of the Kentucky "Grange" tried to stop the practice of price manipulating, but with no lasting result. A new system, known as "country buying", was then introduced by the buyers for the Italian government. Under this plan local representatives of buying interests would visit each farm, inspect the crop in the barns, and contract for its future delivery at an agreed price. They erected so-called factories, or warehouses in the small towns throughout the Black Patch to receive and handle deliveries. The grower delivered the tobacco loose, at his convenience, and received full payment at the time of delivery. Because of these advantages he seemed indifferent for a time to the prices that prevailed.

The buying interests consisted largely of the American Tobacco Company and the several foreign countries that maintain governmental monopoly in the importation and sale of tobacco. The American Tobacco

Company, which had been formed in 1890, grew rapidly and eventually became a gigantic trust. The growers found themselves at the mercy of the trust and were forced to organise. About 1904, the Planters Protective Association was formed. It proposed to receive the crop of its members, "prize" it in hogsheads, and sell it on a commission basis. Buyers, however, refused to purchase from the Association and it had no market. At the same time prices advanced for the growers who were not members of the Association, the "Hill Billies", as they were called in those days.

The success of the Association depended upon inducing the "Hill Billies" to become members and violent methods were adopted to persuade them to do so. A secret organization known as the Night Riders sprang up. Bands of armed men raided the towns and burned the tobacco factories. Smaller bands intimidated the "Hill Billies", burning their barns and crops and even inflicting personal injuries. The campaign of violence and intimidation continued until the Night Riders' purpose was accomplished and the buying interests began to purchase Association tobacco at a satisfactory price.

Prices continued to go up. In 1911 the tobacco trust was dissolved by the United States Supreme Court. Then the Planters' Protective Association rapidly fell to pieces under the more favourable market conditions it had helped to bring about.

After the European War conditions became very unfavourable for the tobacco grower. The trust had been dissolved, but buying was concentrated in a very few hands. During 1921 the Burley tobacco growers in central Kentucky had organised a great co-operative marketing association, which had made an encouraging start. In the dark tobacco area it was decided to form a similar organisation and an organisation campaign was started. Before 1 November 1922 contracts representing over two-thirds of the growers, had been secured. The contracts bound the growers to deliver their tobacco to the Dark Tobacco Growers' Co-operative Association for a period of five years, to be graded, processed, and sold as the Association deemed best.

In April 1923 the Association was operating 110 receiving stations at 82 points in Kentucky and Tennessee. It had received up to that time 132,000,000 pounds of tobacco. Nearly \$8,000,000 had been advanced to its members on deliveries. Banks in the district had lent the Association \$2,500,000 and arrangements had been made with the War Finance Corporation to borrow up to \$7,500,000 on tobacco to be stored in bonded warehouses after prizing.

Although the Association was able to obtain good prices for the tobacco, considerable discontent developed amongst the members before the end of the first year. Many members needed all their money immediately. The new method of marketing, in which the growers' organisation held a large supply of tobacco until the market was ready to receive it, was not yet working smoothly. Some members attempted to evade their contracts, but they were compelled by the courts to fulfil them.

In 1924 dissatisfaction increased and many members succeeded by various devices in evading their contracts and selling outside the Associa-

tion. In its third year of working the Association only received approximately half the amount of tobacco which it received in its first year. Discontent became general. Meetings were held in which members demanded release from their contracts and the dissolution of the organization. In October 1925 the board of directors decided that no legal action would be taken against members who failed to deliver their 1925 crops. With little possibility of obtaining any tobacco whatever, the Association leased many of its warehouses, dismissed most of its employees and retained only a skeleton of the operating organisation.

The members, as a whole, welcomed the opportunity to sell the 1925 crops openly at auction, especially as the reported size and quality of the crops indicated an unusually good price. The markets opened in December and the growers hastened to sell their crops in the expectation of realising high prices and receiving payment at once. But the anticipated prices were never realised. The markets opened with average prices below those of the previous season and quickly fell lower still.

The disastrous experience of the growers in selling their 1925 crop resulted in a demand for the operation of the co-operative association in the 1926-27 season. A campaign was started to secure sufficient contracts to assure the pooling of most of the 1926 crop. Notwithstanding the embarrassment created by the result of certain legal proceedings which had been taken against the Association, it was finally decided to handle the 1926 crop of the members.

Proposed Honey Marketing Association for the "Inter-mountain" States.

The National Farm News, Vol 2, No 23 Washington, 26 March 1927.

The creation of a co-operative association for the marketing of honey produced in the "inter-mountain" states is under discussion in Wyoming, and the Bureau of Co-operative Marketing is advising producers as regards organisation and operating methods.

Bee-keepers in the States concerned, namely, Utah, Idaho, Montana, Wyoming, Colorado and parts of Nevada and Washington, produce a high-grade clover and alfalfa honey which up to now has only reached the Eastern market after mixing with darker honey. The proposed organisation will endeavour to promote the sale of the pure "inter-mountain" honey under its own brands and in containers for retail handling. Most of the members will be large producers whose average output exceeds 30,000 pounds a year.

The quantity of honey produced in this region is estimated to be about 20,000,000 pounds annually.

The Costs of Operation of Farmers' Elevators in the United States.

KUHRT, W. J.: Costs of Operation of a Group of Farmers' Elevators. *Farmers' Elevator Guide*, Vol 22, No 1. Chicago, January 1927.

In the autumn of 1924, a study of the operation of farmers' elevators in the spring wheat area was begun by the United States Department of

Agriculture. This study was intended to cover the operations of a selected group of farmers' elevators over a period of four or five years. The first year a group of about 50 farmers' elevators in Western Minnesota, North Dakota and Eastern Montana were selected and data on costs of operation of 40 of these, covering the 1924-25 season, were secured.

The total costs of operation show wide variations. The lowest total cost recorded was \$3,312, while the highest was \$13,719. The average total cost for the group was \$7,734. In 70 per cent. of the elevators the total cost was between \$5,000 and \$10,000. Variations in total cost are closely related to the number of bushels handled. The effect of increased volume seemed to be a fairly steady increase in costs up to about 300,000 bushels, after which the rate fell until the volume handled was about 350,000 bushels, after which the cost again rose rapidly with increased volume. This was probably due to the fact that the elevators handling over 350,000 bushels found it necessary to hire additional help, instal new or larger machinery, and incur increased costs in other ways.

Volume of business is not, however, the sole cause of variations in total costs, since there are wide variations as between elevators handling approximately the same quantity of wheat.

The average cost of the various items making up the cost of operation was as follows: Management, \$2,312; extra labour, \$1,075; depreciation, \$824; interest, \$685; taxes \$372; insurance, \$422; bad debts, \$230; auditing and book-keeping, \$245; marketing news service, \$204; miscellaneous, \$393; total, \$7,734.

The costs per bushel of wheat handled varied widely between elevators. The lowest cost per bushel amongst the elevators studied was 1.715 cents, and the highest 8.145 cents. The average cost per bushel was 3.57 cents. The most common per bushel cost was between 3 and 4 cents.

As in the case of total costs, there is a close relationship between cost per bushel and volume handled. The costs per bushel decreased rapidly with the increase of volume up to nearly 300,000 bushels. Above this volume, costs per bushel continued to decrease, but for a period at a much slower rate, probably owing to increases in total costs through the employment of more labour and the installation of new equipment. The costs per bushel were, nevertheless, still decreasing at 500,000 bushels.

These figures relate only to a single season and somewhat different results may be found in subsequent years.

Constitution of the Provincial Economic Bureaux and Councils in Italy.

Legge 18 aprile 1926, n. 731: Istituzione dei Consigli provinciali dell'economia. *Gazzetta Ufficiale del Regno d'Italia*, No. 108, Rome, 10 May 1926. — Regio decreto-legge 16 giugno 1927, n. 1,071; Uffici e Consigli provinciali dell'economia. *Gazzetta Ufficiale del Regno d'Italia*, No. 155, Rome, 7 July 1927.

Provincial Economic Councils were established in Italy in 1926 by a law of 18 April, No. 731 (1), the intention being that these organisations

(1) See: Texts of Laws (1926), No. 7 (International Institute of Agriculture).

should replace the Chambers of Commerce and Industry and the Provincial Agricultural Councils (1) and should represent in each province the productive activities as a whole, while safeguarding and encouraging their development. The application of the law was however delayed by the necessity for co-ordinating its provisions with those relating to the new trades organisation (2). The necessity was also recognised of simplifying and making more effective the structure of the Provincial Economic Councils so that they might function as local organisations intimately connected with the central government while suitably adapted to the conditions of the separate provinces. This necessity is met by the Royal Decree of 16 June, No. 1,071, which, while following the fundamental lines of the law of 18 April 1926, introduces some important modifications. In the first place, the Provincial Economic Bureaux are set up as executive bureaux of the Councils, and at the same time, local organs of the Ministry of National Economy. These bodies : 1. act as observers of the local economic and social movements, collecting all relevant information ; 2. encourage all proposals for bringing about an increase in production and the improvement of the economic and social conditions of the province ; 3. are empowered, as representing the Ministry, to act as the civil party in suits for frauds and any other offence relating to the manufacture of and trade in agricultural and industrial products and their derivatives ; 4. issue certificates of origin for commodities and draw up market reports and price lists ; 5. draft reports for consideration by the Provincial Council of Economy, etc.

The Economic Councils in accordance with their obligations under the law draft proposals for the Government and the public administrative bodies regarding measures connected with the economic development of the province ; make suggestions to the Ministry as to modifications and adaptations of the curricula of the educational institutions under its direction, so as to bring them into relation with local conditions and special requirements ; promote the foundation of institutes for vocational education and of other institutions in the interest of the economic development of the provinces ; make suggestions regarding special provincial regulations for facilitating the effective application of laws relating to agriculture, industry, trade, credit, savings and social insurance ; give advice on the rural police regulations, as regards control of diseases and pests of cultivated plants, malaria control, trespass on pasture lands, protection of lands and crops. In addition the Councils report on the regulations for fairs and markets and other questions relating to production, credit, savings, social insurance and vocational education ; they compile and periodically revise the information obtained on the commercial and agricultural usages and customs of the province ; they administer the trade exchanges, and, with the authority of the Ministry are also empowered to

(1) See : *International Review of Agricultural Economics*, No. 2 (April-June) 1924, p. 268

(2) See : *International Review of Agricultural Economics*, No. 3 (July-September) 1926, pp. 381-396.

establish and direct departments and undertakings in the interests of agriculture, industry and trade.

The Councils are composed of from twelve to twenty-eight elected members, appointed by the legally recognised trades organisations and by the provincial institutions. There are in addition certain officers who have special acquaintance with local economic activities and who are *ex officio* members. Every Council is divided into sections, the functions and composition of which will be fixed by special decree. The post of chairman of Council is filled by the prefect assisted by the vice-chairman and the chairmen of sections who are appointed by the Ministry of National Economy.

INSURANCE AND THRIFT

General Crop Insurance in the United States.

REID, Edwy B. Farming with an Insurance Policy. *Country Gentleman*, Vol. XCII, No. 3. Philadelphia, March 1927.

Since about 1920 a considerable development has taken place in the United States in the general insurance of crops against all hazards except personal negligence on the part of the farmer himself. The insurance is written for a stipulated sum per acre.

So far this form of insurance has been applied mainly to market garden and fruit crops, though it has been also applied to cane-sugar production in Louisiana and to potato-growing in Maine. It is being extensively written in the market garden areas along the seaboard of the Carolinas, in certain sections of Florida and in the market garden areas of Georgia, Alabama, Louisiana and Texas. The peach-growing areas of the Carolinas and Georgia are, for the most part, covered by crop insurance, and the same kind of insurance is written also in the Ozark fruit district and in Virginia.

The policies protect the market gardener, for example, against all hazard such as excessive moisture, drought, hail, wind and frost. They also protect him against losses on account of marketing conditions, since the loss is determined by the difference between the amount of insurance and the f. o. b. returns. The market gardener, however, agrees to follow a certain line of agricultural practice and to allow his crops and products to be inspected periodically. He is permitted insurance to the extent of 75 per cent. of his cost of production.

In the South and Southeast general crop insurance is being written more with a view to serving as additional collateral for obtaining credit than as an insurance against calamity. The farmers are endeavouring in this and other ways to release themselves from dependence upon the merchant for credit. Buying on credit often added from 10 to 30 per cent. to the cost of equipment and requisites for production, and by paying cash the farmer frequently saves enough to cover both the insurance premium and the interest on the money he borrows.

The system of insuring growing crops has developed almost simultaneously in the South with the growth of the intermediate credit banks. Apart from lending directly to farmers' co-operative marketing associations these banks act as rediscount banks, only taking agricultural production paper from banking institutions. The regular banks have not, so far, made much use of the intermediate credit banks, and so a number of agricultural credit corporations has been established under State laws to make agricultural production loans. It is from these credit corporations that the farmer usually borrows where he uses a general crop insurance policy as collateral security.

The credit corporation and the insurance company frequently collaborate closely and, without hampering the farmer's activities, see that his farm is conducted in a businesslike way and that he markets his crops to advantage. In some instances the credit corporation is set up as an auxiliary to a marketing association and insists that the crop shall be marketed through it.

Examples may be given of the working of the system described. In 1925 the Federal Intermediate Credit Bank of New Orleans made, through various agricultural credit corporations, loans to the sugar-growers of Louisiana amounting to about \$1,500,000. Three-quarters of the bank's advances were secured by crop insurance policies. Several of the plantations on which loans were made suffered heavy crop losses and the insurance company was called upon to pay in compensation sums aggregating about \$60,000. These sums were credited by the bank on the growers' notes. The following year the insurance company agreed to cover the cultivation and harvesting costs and the bank advanced money only for those purposes. Some losses were occasioned by a hurricane, but the bank was adequately protected.

In 1924 four members of the Naranja Trucker's Association in Dade County, Florida, took out insurance for three years on 100 acres of tomatoes. The total coverage for the three years amounted to \$42,000, the rate of insurance being \$140 per acre. The growers borrowed on the security of the policy from a credit corporation which, in turn, used the policy as collateral in discounting the growers' notes with the Intermediate Credit Bank of Columbia. In 1924 the growers made \$11,802, rather less than the sum covered by the insurance. In 1925 they made \$15,559, or more than the sum covered. In 1926, however the crop was short and they made less than \$100 per acre on it. In the three years they sold their crops for about \$37,000 and the company had to make up the difference between this sum and \$42,000.

Peach-growers in a section of North Carolina obtained production loans from an intermediate credit bank and were insured under a two-year policy to the extent of three-quarters of the cost of spray materials, fertilizer and labour. Owing to a late frost and the fact that the entire production of the Southern States came on the market within a brief period, and that prices were consequently low, the great majority of the growers failed to produce enough to meet three-quarters of their insured costs. The insurance company will have to carry over losses exceeding \$50,000, while the grower will be financed by the bank for another year under supervision.

The experience so far gained has shown that it is not good policy to try to insure profits but sounder to limit insurance to, say, 75 per cent. of the actual expenses incurred in making the crop; that insurance of a conservative gross monetary return is better than assuring a given number of bushels per acre and a maximum price; that crop insurance should not be employed to bolster up farming on marginal areas but to support sound farming and sane marketing. As an agency for avoiding calamity and as an aid in obtaining working capital for making and marketing crops general crop insurance which guarantees a certain return per acre has already proved of great value.

Hail Insurance in Saskatchewan, Canada.

Public Service Monthly, Vol. XV, No. 10. Regina, May 1927.

The manner in which the premium rates of the Municipal Hail Insurance Association of Saskatchewan had been fixed was explained at the annual meeting of the Association. Records of losses for each municipality extending over a period of thirteen years had been considered and the localities which had the lowest loss were given the lowest possible rate, while for those with greater loss, relatively higher rates were fixed. In fixing the rate for a municipality just entering the scheme, the rates of contiguous municipalities were taken as a guide until the records regarding the municipality were sufficient to warrant their being taken as a basis.

The Additional Hail Insurance Association, which was formed in 1924 to provide supplementary insurance for farmers insured by the Municipal Hail Insurance Association, had a premium income in 1926 of \$95,399 as compared with \$68,061 in 1925 and \$19,481 in 1924. The compensation paid in 1926 amounted to 64.69 per cent. of the premium income, as compared with 34.4 per cent. in 1925.

ECONOMIC AND SOCIAL CONDITIONS OF THE AGRICULTURAL CLASSES

Living Expenses of Farmers in the United States.

KIRKPATRICK E. L. *The Farmer's Standard of Living. United States Department of Agriculture Bulletin, No. 1466. Washington, November 1926.*

The United States Department of Agriculture has published a study of the living expenses of 2,886 farm families in selected localities of eleven States. The data were gathered by means of personal visits, the period of these visits ranging from 1922 to 1924. Typical farm homes were visited, the selection of households of any one size or level of living being avoided.

The average annual living expenses per family of all families included in the study were found to be \$1,598, the lowest average per State being South Carolina \$1,482, and the highest being Massachusetts, \$1,948. This figure included food, house rent and fuel. The average size of the family was 4.4 persons. More than two-fifths of the general average of \$1,598 was covered by goods supplied by the farm. The value of food supplied by the farm was almost twice the value of house rent and fuel supplied.

The various items included in the \$1,598 were found to be apportioned as follows:—

Food	\$659	41.2
Clothing	235	14.7
House rent	200	12.5
Furniture and equipment	40	2.5
Farm requisites	213	13.3
Maintenance of health	61	3.8
Life and health insurance	41	2.6
Advancement (education)	105	6.6
Personal	41	2.6
Unclassified	3	0.2
	\$1,598	100

The expenditure for clothing was about the same, *viz.*, \$59 each, for husbands and wives. The average costs for sons of the age groups over 24 years, 19 to 24 years, and 15 to 18 years were respectively 1.26, 1.54 and 1.24 times as high as the average costs for clothing for the male heads of families. The average costs in this respect for daughters of the same age groups were 1.42, 1.67 and 1.36 times as high as the average costs for female heads of families.

An instructive supplementary tabulation is that relating to the living expenses of households consisting *only* of members of the immediate family supported from the family purse. The enquiry covered 1,662 such families with number of children ranging from none to six, and excluded families where hired helpers, boarders or others were housed or fed. Families with children away at school, provided their expenses are paid from the family purse, are included.

In the first place, the average value (\$1,460) of all goods used per families by the 1,662 families is somewhat lower than the average value (\$1,598.) of all goods so used by the 2,886 families of the study. The actual amount, however, increases somewhat irregularly for the 1,662 families from about (\$1,100) for families with no children to over \$1,950 for families with six or more children. The proportion of the value of food to the value of all goods used increases from 39.6 per cent. for families of no children to 46.5 per cent. for families of six or more children. Similarly the proportion of the cost of clothing to the value of all goods used increases from 11.1 per cent. to 17.9 per cent. Apparently clothing used approaches the minimum and so in the case of large families it becomes necessary to reduce the expenditure for less essential goods, the same of course, is inevitable with respect to food. The proportion that the value of goods, *i. e.*, food, housing, fuel, furnished by the farm, bears to the value of all goods used is higher with these 1,662 families, *viz.*, 44.1 per cent., in comparison with the 42.8 which represents this percentage in the general enquiry.

The average length of the working day of the farm operator was found to be 11.3 hours and of the women of the farmhouse 11.4 hours, exclusive of meals or resting.

The average number of years the operator has been a farm owner is closely associated with expenses. Mortgage indebtedness on the farm, taken generally, however, seems to have no bearing on the expenses.

Proposals for Counteracting the Depopulation of Country Districts in Italy.

Osservazioni e proposte sul fenomeno dello spopolamento delle campagne. Memoriale della Confederazione Nazionale Fascista degli Agricoltori Roma, anno V^o 10 febbraio 1927. — Questionario sulle case rurali e sulle condizioni di vita dei lavoratori agricoli. Confederazione Nazionale dei Sindacati Fascisti : Federazione Nazionale Sindacati Fascisti dell'Agricoltura Roma, 1927.

The phenomenon of depopulation of the country-side does not present in Italy alarming proportions ; some signs, however, of urbanisation have

become apparent in certain districts. From 1911 to 1912 the population of the towns of over 15,000 inhabitants increased on an average by 13.69 per cent., while in the small communes the increase was only 4.01 per cent. The regions in which the phenomenon is most serious are : Piedmont, where the population of the small communes has diminished by 4.74 per cent. while in the towns it has increased by 12.3 per cent. ; the Abruzzi and the Molise, Basilicate, Venetia Tridentina and the Julian Venetia (1). These facts have caused the National Fascist Confederation of Farmers to study the question, and to propose to the Government certain measures with the object of improving the conditions of agricultural workers and of preventing their exodus into the towns. It is proposed (a) to introduce into legislation the right of the tenant to repayment of his expenditure for improvements made on the farm ; (b) to encourage by loans and by government subsidies the construction of rural dwellings and in particular of the buildings which go to form the small centres of rural life (the church, school, shops, health officer's house, etc.) ; (c) to require owners to maintain rural buildings in good repair ; (d) to facilitate by loans, premiums, etc., the establishment of brick kilns in country districts ; (e) to make provision for the consolidation of over-subdivided holdings ; (f) to develop leisure time occupations with a definite rural bias.

For the inhabitants of mountain districts the proposals are : increased attention and regard to the improvement of mountain pastures, the scientific improvement of meadowland in areas where intensive farming is not yet carried on, improvement in sheep breeds, the revision of existing regulations relating to pasturing, the migration of flocks, etc.

It is realised that there are certain industries, which, as a means of reducing the wages bill or for other reasons, recruit agricultural labourers in large numbers, and thus draw away from agriculture the able-bodied members of families of share tenants or of small holders or tenants, who are attracted by the prospect of earning an individual wage in addition to the farming wage paid to the family. To counteract this tendency, it is proposed that : (a) steps be taken to bring about an equilibrium between the wages of town and country ; (b) workers' syndicates be empowered by special provisions to oppose the recruiting of agricultural labour for the benefit of industry, when such recruiting involves infringement of labour contracts, prejudicial withdrawal of labour from the country, competition of members of rural families with other workers, physical and moral deterioration of the younger men, who after a few years return to the countryside.

The National Federation of the Fascist Agricultural Syndicates, with the object of ascertaining the causes which determine or may influence the phenomenon of urbanisation, has addressed to its branches a questionnaire on rural dwellings and on the conditions which prevail among agricultural labourers. As regards the first point, it is desired to obtain an accurate

(1) See : GIUSTI, Ugo : *Lo sviluppo della popolazione Italiana fra il 1911 e il 1921*. Extract from the periodical " *L'Universo* " Year VI, No. 2 February 1925.

statement as to the solidity, hygienic character, comfort and seemliness of houses in the country ; as regards the second, the intention of the questions is to ascertain the dietary and the standard of clothing of the peasants, the quality of the household equipment, furniture, utensils, etc., existence of savings and the method of their investment, the possible occurrence of usury, the most prevalent forms of disease, the existence and extent of the rural migration and exodus, the general level of decency and morality, the kind of amusements and the sort of reading preferred by the peasants, the strength of family feeling and of paternal authority, the prevalence of small holdings, the additions to wages made by the practice of small rural industries, ordinary school attendance and at courses of vocational education.

In the instructions accompanying the questionnaire it is stated that the classes concerned are those of the small tenants and owners who cultivate their land themselves, share tenants of all types, labourers engaged on a hiring agreement, ordinary wage-earning and seasonal labourers.

The results of the enquiry, which covers important aspects of the life of the agricultural labourer, will be submitted to the Government for such action as may appear desirable.

LAND SYSTEMS

Establishment of Small Holdings in Denmark with State Loans, 1900-1926.

Byggeomkostninger for et Husmandsbrug November 1926 (*Costs of Buildings on a Small Holding in November 1926*). *Statistiske Efterretninger*, No 37 Copenhagen, 1926. — Oprettelse af mindre Landbrug i Henhold til Statshusmandslovene samt Jordlovene af 1919 (*Establishment of Small Holdings in Accordance with the various Small Holdings Acts and the Land Acts of 1919*) *Statistiske Efterretninger*, No. 5, 1927.

Since the first Small Holdings Act (of 1899) came into force and up to the financial year 1925-26 about 12,600 holdings have been created by means of State loans and State grants made in accordance with the various Small Holdings Acts. The total aid amounts to more than 120 million crowns, 15.2 million crowns of this sum being additional loans for enlarging holdings already established.

For the past 26 financial years the number of holdings created and the number of loans and subsidies given have been as follows :

TABLE I. — *Holdings Created, Loans and Grants.*

Years	Number of holdings created	State loans and State grants (million crowns)
1900-1915	1,636	37.1
1915-1916	505	4.2
1916-1917	413	3.2
1917-1918	274	2.1
1918-1919	225	1.9
1919-1920	150	1.3
1920-1921	137	2.5
1921-1922	400	8.0
1922-1923	904	19.0
1923-1924	926	11.0
1924-1925	547	9.1
1925-1926	501	9.9

The great increase of holdings created in the financial year 1921-22 was due to an act brought into force in 1921 which granted the farmer 15 % of the loan value as a direct subsidy, thus enabling him to have more capital at his disposal when starting operations. As a consequence, presumably, of the reduction of this subsidy to 10 % in 1923 the number and amount of loans fell again considerably. The abolition in 1924 of the direct subsidies and their replacement by building loans, which were partly free of interest, seem to have brought about another, but only slight fall in the figures.

Since 1920, however, small holdings created by State aid have not been limited to the numbers given in the table above. According to the Land Acts of October 1919 (1) other 3,387 such holdings were created between 1920 and 1926. Of these 1,042 were on glebe land and 2,345 on crown land, *i. e.*, principally on land formerly belonging to the fiefs and family estates but surrendered for parcelling purposes to the crown. For enlarging already existing small holdings 1,522 lots have, besides, been parcelled out, 662 being on glebe land, the rest on Crown land. It will be seen from the preceding and the following table that during the last two years nearly the same number of holdings (1,100) have been created in accordance with the ordinary Small Holdings Acts and the Land Acts of 1919.

During 1920-26 the total sum granted by the State as building loans in accordance with the Land Acts of 1919 amounted to 42.7 million crowns and the area parcelled out to 27,000 hectares. The average area of the new holdings was for the same period about 7 hectares and the average

(1) For full information on these laws, see *International Review of Agricultural Economics*, 1926, No. 1, p. 59.

TABLE II. -- *Holdings created and enlarged under the Land Acts of 1919.*

Year	New holdings established			Enlargements of old holdings		
	Number	Area (hectares)	Building loans (1000 crown-)	Number	Area (hectares)	Building loans (1000 crowns)
1920	195	1316	3107	386	542	49
1921	333	2180	5341	183	537	99
1922	658	4675	7879	203	625	198
1923	652	4676	7462	261	780	267
1924	413	2731	4920	226	560	182
1925	606	4151	7547	141	348	98
1926	530	3508	5515	122	330	85

value per hectare 1920-25 (for 1926 the data in this respect are not yet available) 1,060 crowns.

The cost of buildings in connection with a small holding of ordinary type, *i. e.* buildings that in 1914 could have been put up for 6,000 crowns, amounted in 1926 to 12,000 according to experts' estimates required by the Statistical Department. The corresponding cost, calculated for intervening years, will be seen from the following table. It has been assumed by the estimate that the building site was 7 kilometres from the nearest railway station.

TABLE III. -- *Estimated Cost of Erection of the Buildings of a Small Holding.*

Years	Estimated cost (crowns)	Index numbers (1914 = 100)
1914	6,000	100
1919 Dec.	18,738	312
1920 "	21,884	365
1921 "	15,361	256
1922 "	13,522	225
1923 "	13,941	232
1924 "	14,500	242
1925 Nov.	13,880	231
1926 "	11,955	199

As according to the Land Acts of 1919 the building loan, which is partly free of interest, may amount to $\frac{9}{10}$ of the total estimated building costs, it will be seen that *e. g.* in 1926 it was possible for a holder to obtain 10,800 crowns about for that purpose, an opportunity of which good use

was made, the actual average sum received as building loan in the case of newly created holdings being 10,400 crowns in 1926.

The favourable terms on which the small holder may receive loans for building purposes, are, however, not the sole advantage offered him by the Land Acts of 1919. One of the other most essential benefits is, that he has to pay no purchase money for the land, which he nevertheless possesses with all the essential rights of an owner. He has only to pay the State the interest on the value of it as estimated on the occasion of the periodical valuations of all the estates in the country.

Facilities given in Ecuador for European Immigration.

Comercio Internacional Year VIII, No. 1, Guayaquil, January 1927. — *Colombo*, Year II, Part I, Rome, January 1927.

An active propaganda campaign is being carried on in Ecuador for strengthening the immigration movement of good European stocks with the object of encouraging the settlement of the country. Preference will be given to emigrants possessing capital, however small, since it is essential that the finances of the country should not be overburdened, and also European paid labour cannot advantageously compete with native labour, which consists of the *conciertos*, or Indians, who receive very low wages for their work.

In consequence of the privileges granted by the Government of Ecuador, groups of Europeans have established themselves in some parts of country, founding colonies which are mainly agricultural.

An agreement has been made recently between the Government and the Hungarian colony which has been established in the parish of Mindo. The Government has granted the following facilities:—

1. Sale of parcels of land, not exceeding 50 hectares. This sale is to be made gradually and at the same time as the parcels, which were at first only 10 hectares, are brought under cultivation. The price will be 60 *centavos* the hectare, payable at once or in instalments;

2. Sale of the implements and seeds which the settler may require at special prices and by instalments;

3. As an initial subsidy, for persons engaging in agriculture, the Government will make a monthly payment of 60 *pesos* to bachelors, 120 to married persons, and 135 to those with children; this payment will be continued for one year to the first settlers and for six months to those who join the colony later. For 1927, the number of later settlers may not exceed 300.

The colony undertakes for its part to remain on the territory for ten years, and to develop agricultural work, stock-breeding and fishing and also to open up the land and river communications

As regards agriculture, the settlers propose to devote their attention to growing coffee, cocoa, rubber, vanilla, tobacco and choice timber, of which there is an abundant supply in the region. In view of the difficulties of individual work, a number of co-operative societies of different types

are being formed among the settlers. The colony hopes to attract groups of German emigrants from the former German colonies in Africa, who are already familiar with tropical agriculture.

An Italian colonisation scheme reported the district of Quinindé, has obtained from the Ecuador Government a concession of 12,000 hectares of very fertile land, and the promise of all possible facilities.

MARKETING OF AGRICULTURAL PRODUCE

The Cuban Sugar Commission and Crop Limitation.

The Cuba Review, Vol XXV, Nos 2 and 3 New York, January and February 1927

In consequence of over production, mainly due to war time requirements and to the absence of proper legislation, a marked decline has taken place in the last few years in the price of Cuban sugar. With a view to encouraging a rise in prices, a Sugar Commission has been appointed, consisting of six representatives of the large planters, and six of the *colonos* or small growers renting land from the sugar mills, assisted by experts on sugar questions. This Commission proposes to enquire into and to put into force all measures that may seem advisable without, however, prejudicing the economic life of Cuba or the interests of the growers.

The principal measure decided on by the Sugar Commission is the annual limitation of the production of sugar, with the object of a better adaptation of the supply to the demand on the important markets for Cuban sugar.

For the year 1926-27 the Commission recommended limitation of total output to 4,019,445 Cuban tons, and this was approved by the President of the Republic by Decree of 3 May 1926. Reckoning the production of 1927 at 31,015,382 bags of 320 Cuban pounds each, the Commission has fixed the maximum number of bags from each region as follows: Pinar del Rio, 1,081,506; Havana, 2,292,347; Matanzas, 3,398,976; Santa Clara, 6,131,132; Camaguey, 9,290,038; Oriente, 8,839,384.

At the same time, the Commission has instructed the Planters' and Refiners' Association to fix for the different refineries the maximum output, taking the capacity of each into account. If a satisfactory agreement can-

not be reached within a stated period, the Commission reserves the right to proceed to the fixing of the quantities, from the data in its possession.

Diminution in the Average Consumption of Flour in the United States.

Agricultural Review, Vol XX, No 2 Kansas City, Missouri, February 1927

The Food Research Institute of Leland Stanford University reports that the *per capita* consumption of flour in the United States fell off 10 per cent. between 1904 and 1919, and 12 per cent. more between 1919 and 1923. The *Journal of the American Medical Association* estimates the decrease in the *per capita* consumption at over 21 per cent. in 21 years. The reasons given are as follows:—

1. There has been a tendency to replace the cereals with sugar. Increased sugar consumption is probably the continuation of a change that has been in progress for 20 years or more;

2. The total *per capita* food requirements have declined, probably because there is more machine and office work and less manual labour than formerly;

3. The greater prosperity of labourers since the war has led to diversification of diet and increased consumption of more expensive foods. Flour has thus been replaced to some extent by fruits, vegetables and dairy products.

If the *per capita* consumption of flour had been as large in 1925 as it was in 1904, there would have been little wheat for export from the States and the domestic market would have been much stronger, the annual consumption being 90,000,000 bushels more.

The Marketing of Cheese in England.

The Field, Vol CXLIX, No 3868 London, 10 February 1927

At a representative meeting of Cheddar cheesemakers held in January it was decided to form a South-Western Federation of Cheesemakers to develop a marketing organisation for Cheddar cheese. In this the Somerset farmers are following the example of the Cheshire farmers. Considerable success has attended the advertising campaign of the Cheshire Cheesemakers' Federation. This latter Federation has also recently formulated a scheme to secure uniformity in the quality of cheese produced by individual members. It will appoint an officer who will periodically visit the farms of the members and check their methods of production. The producer who scores 92 points out of the 100 awarded by the Federation on the basis of flavour, texture, keeping qualities, colour and finish, will be qualified to use the trade mark of the Federation. It is hoped that the use of this trade mark will help to establish Cheshire cheese in public esteem.

The Abolition of the Grain Monopoly and the New Measures for promoting and protecting Grain Growing in Norway.

Norsk Lovtidende, Oslo, 1926. No. 25, p. 318; *Nationen*, Oslo, 1927, 20 and 25 May; *Landtmannen*, Stockholm, 1927, No. 17, p. 362.

The Norwegian Parliament has recently passed a bill ("Korntrygd") introduced by the Government and aiming at the promotion of cereal growing and securing the grain supply more effectively than is possible under the system of protective duties alone. At the same time as the new law comes into force on 1 July of this year, the grain monopoly, which was introduced during the war, will be abolished.

The new law, strictly speaking, implies the prohibition of the importation of wheat, rye, barley and oats as well as of their milled products.

Any person, however, who has bought or pledged himself to buy a certain amount of homegrown cereals, barley excepted, will be granted an import licence for a corresponding amount of foreign grain.

No licence will, as a rule, be granted for the importation of oats as the supply is considered adequate to the demand.

The State undertakes to buy from the growers all wheat, rye and barley suitable for human food and on delivery at every State depot, railway station or regular place of call for steamship and motor boat to pay the c. i. f. price for imported grain plus a bounty of 4 crowns per 100 kilos. For the transport of the grain from distant districts to the places of delivery a freight indemnity will be paid by the State under special regulations. On the same principle the State will buy at least 15,000 tons of oats, partly for its own use and partly for delivery to the grain mills. The law provides, however, not only that every grower shall receive a bonus for grain purchased by the State, but that he should also be entitled to a bounty of 4 crowns per 100 kilos for any cereal ground for use by his own household, the annual consumption per head being estimated at 200 kilos. The bounty is disbursed by the treasurer of the district (*herred*) on production of grinding certificates which will be distributed to every grower on application. About 150,000 of these certificates will probably be issued.

Wheat, rye, and barley procured by the State is sold to importers at the same price as that at which imported products can be purchased in Norwegian harbours. For country mills the price will be somewhat reduced. The grain is as a rule delivered at the railway station or regular stopping place of the steam and motor boats nearest to the purchaser without any addition for freight.

It is estimated that these two kinds of bounties will cost the State 4,600,000 crowns (600,000 for grain purchased, 4 millions for that consumed in the growers' households), a sum which it is intended to raise by an import duty per 100 kilos of 3.50 crowns on wheat and 5.70 crowns on wheat flour. The cost of freightage, estimated to amount to 4.1 million crowns, will be covered by a special import toll on all cereals and flour fit for human food, which in the cases of wheat, rye and barley is fixed at 1.10 crowns per 100 kilos, for wheat flour at 1.65, and for rye and barley flour at 1.85.

In 1924 the value of all grain imported into Norway reached a total of

235 million crowns and in 1925, the last year for which data are available, of 200 millions.

Overseas Marketing of Dairy Produce in New Zealand.

New Zealand Dairyman, Vol. XXXI, Nos. 1, 4, 5, 6. Wellington, October 1926, January, February and March 1927. — *Queensland Producer*, Vol. 8, No. 38. Brisbane, 23 March 1927. — *New Zealand Official Year-Book*, 1927. — *Monthly Abstract of Statistics*. Wellington, April 1927. — Report of the Imperial Economic Committee on Marketing and Preparing for Market of Food-stuffs produced within the Empire Fourth Report: Dairy Produce. London, 1926. Sections IX, XVIII, XXI and XXII. — *Vort Landbrug*, Vol. 46, No. 14, pp 191-194. Copenhagen 1927. — *Tidskrift för Finlands Svenska Lantmän*, Vol 9, No. 7, pp. 95-97 Helsingfors, March 1927.

The difficulties attending the exercise of powers of control, and in particular the attempt to fix prices, by any organised group of producers or exporters have found striking illustration in the history of the present policy of the New Zealand Dairy Produce Export Control Board. Under the Act of 1923 by which this Board was established, subject to a poll taken among the dairy producers of the Dominion who voted in its favour by a large majority in 1924, the Board has power to determine from time to time the extent to which it should exercise control over export and marketing, and whether such control should be absolute or limited in respect of the commodity. The Board's decision to assume absolute control in August 1926 and its subsequent action have had certain results that may perhaps be examined with advantage, while it is of some interest to compare the policy of the New Zealand Board with that adopted in almost similar circumstances by the Australian Dairy Produce Control Board, established on the same lines, which has exercised control since July 1925.

The main facts of the New Zealand dairy industry and export trade may be briefly summarised as follows.

The suitability of the land and climate of New Zealand, and in particular of the North Island, to a large development of dairying was early recognised by the Government, and by a succession of Dairy Industry Acts with amending legislation, dating from 1892, every State facility has been given for the erection of factories and for development on modern and improved lines, with particular attention to herd testing, mechanical milking, grading and cool storage. Co-operation has been applied to dairying from the first and 90 per cent. of the 445 dairy factories existing in 1925 were owned, controlled and financed by the farmers. The official returns for 1925-26 show 498 factories, 68 with dual plant, *i. e.*, capable of changing over from manufacture of butter to cheese, or vice versa, according to market requirements. It has been estimated that the actual number of dairy cows in the Dominion is nearly equal to that of the whole population, or about one and a half million. New Zealand is now one of the principal dairy produce exporting countries in the world, and approximately one quarter of its population are engaged in the industry.

The latest available complete statistics, those for 1925, show that the total export of butter from New Zealand was 1,245,324 cwt., of which 1,186,965 cwt. (63,800,000 kilos) were taken by Great Britain. (Somewhat lower figures are quoted for 1926). The total export of New Zealand cheese in 1925 was 1,376,754 cwt., Great Britain taking 1,371,986 cwt. It may be added that for the years 1923-25 more than half the import of unsweetened milk powder into Great Britain has come from New Zealand. Hence it is clear that Great Britain is the chief customer of the Dominion in dairy produce, though certain quantities of New Zealand butter also reach the United States and Germany and a few other countries. On the other hand, if butter, cheese and the minor products are taken together, New Zealand is the leading supplier to Great Britain.

The centre of interest for New Zealand is however the butter export, which in value greatly exceeds that of cheese, the figures for 1926 being over £9,300,000 for butter, and about £5,900,000 for cheese. Taking the total import of butter from all countries into Great Britain in 1925 as 5,853,200 cwt., rather more than one-fourth of this total was supplied by Denmark, rather more than one-fifth by New Zealand, rather less than one-fifth by Australia, while of the minor importers the Irish Free State and Canada together only supplied about one-tenth. These figures make evident the interest New Zealand producers have in maintaining this export trade on favourable terms, and it is on this account that a London Agency was instituted by the Export Control Board, with the function of keeping the Board in Wellington informed as to current prices and other matters relating to the disposal of the Dominion's dairy produce in England.

It should be explained that it was precisely the dissatisfaction felt by the overseas producers in regard to the conditions under which their produce was being marketed in the home country which led to the establishment of the Control Boards alike in New Zealand and in Australia. The real crux of the situation is in fact to be found in the great price fluctuations which have, during the post-war period, recurred seasonally. In the years 1923-25 the highest price realised for New Zealand unsalted butter was 232s per cwt., the low prices ranging between 165s. and 140s. The fluctuations for salted butter were less marked but also considerable. The complaint of the producers was that the greater part of their butter had to be sold at or near the lower rather than the higher figures.

The reason for this inability to command the higher prices is comparatively simple. New Zealand has at present only a short dairying production period, *viz.*, October to April. Reckoning nearly two months for the overseas transport, the largest supplies to Great Britain are therefore distributed over the period December, or more usually January, to June, during which months four-fifths of the total export arrives in London or out-ports. The supplies from Denmark, on the other hand, mainly owing to the development of winter dairying in that country, are almost evenly spread over the whole year; hence the large consignments from the Southern hemisphere, coming as an addition to the nearly constant supply, naturally tend to bring about a fall in prices in the early months of each year. In October-

November, the supplies from northern countries are of course lessened, and prices are in consequence high, but although the dairying season is already in progress in New Zealand, the supplies are, on account of the great distance, still some six or eight weeks away from the market.

Other causes are no doubt contributory. Southern hemisphere butter tends to suffer, at least in reputation, from the long transit. However effective the refrigerating of overseas produce is known to be, the customer has inevitably a preference for butter which the date mark shows to have been in the churn only a few days before the purchase. Again the price fluctuations may be partly due, or so at least the overseas producer is inclined to believe, to the action of the buyers themselves, *i. e.*, wholesalers, the large multiple shops and other dealers, who hold off in anticipation of the natural fall, thus sending the price still lower, while on their at last entering the market, prices react, and the buyer is able to re-sell at a large profit.

In consequence therefore of the disadvantageous prices regularly obtained by the larger portion of the New Zealand supplies, it became the practice for certain New Zealand factories to send their butter to Great Britain with instructions that it must not be sold until the market price had reached a certain level. It will be seen that such a practice could only benefit the individual producer at the expense of others, as the highest average price on large supplies is only secured when such supplies are placed upon the market regularly and as soon after production as possible. In other words orderly marketing is absolutely essential to the successful handling of the output of large districts or whole countries. The true function of an Export Control Board should be to ensure such orderly marketing.

The powers conferred by legislation on the Dairy Produce Export Control Boards both in Australia and in New Zealand are undoubtedly very great. In either case the Boards are composed of twelve members, including two Government nominees, and the remainder representatives of producers. Export is only permitted under licence obtained through the Boards and no contracts for carriage by sea can be made except by or through the Boards. They have power to give any direction as regards handling, marketing, storage, sale and disposal of produce, and its insurance against losses. In short, although the Boards cannot own the produce at any stage, they are empowered to take control of the whole supply and to direct its export and sale.

The Australian Board has on the whole confined its action to a general policy of organisation and supervision of marketing, negotiation for reduction of freight charges and for combined insurances. Price regulation has not been attempted and indeed is much deprecated in Australia. Following however the Danish precedent of official weekly quotation fixed by a Committee representing both producing and exporting interests, the London Agency of the Australian Dairy Produce Control Board holds weekly consultations with importers and distributors of Australian butter, and in this way an endeavour is made to give a "lead" to the market in regard to the price.

The New Zealand Board in its first two years worked along somewhat

similar lines as regards direction of the export trade obtaining favourable terms for freights and insurance for producers. It would seem, however, that compulsory powers in respect of the dairy companies were assumed in a way not altogether acceptable to the industry, and that even before the establishment of absolute control of exports in August 1926 there were signs that definite steps in the direction of price fixing were being contemplated, contrary to the considered opinion of many leading producers in the Dominion.

Shortly after that date the Board issued a "Memorandum of Instructions to the British produce merchants governing the finances, handling and sale of butter and cheese under the control of the Board". By this it was definitely ruled that the London Agency should fix minimum prices for finest and first grade butter salted and unsalted, and that no sales ex steamer were to be made without instructions from the Board. The stocks on arrival, which of course included the large seasonal consignments of the early months of 1927, were to be held in cold store until the market price should rise to the level fixed. It became almost immediately clear that the practical result of such a policy would only be to antagonise the British wholesaler, and there was in fact a boycott of New Zealand butter, which accordingly remained in store, or was sold in very small quantities and eventually at prices much lower than the prices of the corresponding period of 1926. In other words, the prices fixed by the London Agency for January and February, which are "peak" months for supplies of Southern hemisphere butter, were from 172 s. to 174 s. per cwt., but it proved impossible to sell at those prices, and from the middle of February to 12 March the prices were gradually lowered to 158s., without however stimulating demand. During the same period Australian and Argentine stocks were being cleared, at prices from 168s. to 158s. while Danish butter was commanding prices which remained at 20s. to 25s. per cwt. higher than those asked for New Zealand butter, whereas in previous years this difference usually averaged about 12s. The price fixing policy had thus completely defeated its own ends, and the situation was made the more serious from the fact of the large accumulations in cold store in London. It was estimated that on February there were 300,000 boxes (1), or 7,500 tons of New Zealand butter of "best quality" in store in London. On 1 March the accumulation was stated to be over 10,000 tons, while approximately 20,000 tons were due to arrive in March, April and May. It should be noted that in order to deal with the annual production of New Zealand without undue clashing with the high production period of the Northern hemisphere, *i. e.* May-June, it is regarded as essential the New Zealand butter should go into consumption in Great Britain at the rate of at least 1,500 tons per week. Instead since the price-fixing policy came into action, the weekly sales of butter averaged only 650 tons, and for four weeks of the period averaged only 500 tons.

The whole situation caused great uneasiness in New Zealand, and the

(1) New Zealand butter, like Australian, is exported in boxes containing half a hundredweight, or 56 lbs.

action of the Board was freely criticised while constant consultation took place between the Export Control Board and the London Agency. On 12 and 14 March the Control Board met in Wellington and a motion was carried by six to three votes ; " That all resolutions and restrictions dealing with the fixing of prices are hereby rescinded ". A further recommendation was made that " given quantities of butter (2,300 tons per week till end of June) be sold each week for what they will fetch ". The market prices proved to be 148s to 146s. the cwt., and in view of the inevitably deteriorated condition of the stocks in store, lower prices were anticipated. The statistics of April 1927 show that while the total export of butter advanced from 1,156,326 cwt. for 1925-26 to 1,228,032 cwt. for 1926-27, there was a decline in value of £334,990. It is urged in New Zealand that the Control Board should in its future policy follow the lead and example of the Australian Board and confine itself to control by shipping license. However this may be, it is evident that the problems of overseas marketing of the products of a whole country are not rendered easier by attempts to control prices. In the case under consideration there are indications that the adoption of the recognised practice of the official weekly " lead " would be an advantageous alternative method to the arbitrary price-fixing which has proved so disastrous. Further that the stabilisation of prices at a higher level might well be the result of encouragement of winter dairying. If this practice could be to any extent adopted in New Zealand, as in Denmark, the dairy produce of the Southern Hemisphere winter(May-September), arriving in Great Britain or other northern importing countries during the northern autumn and early winter, exactly when it is most wanted, would command the higher prices naturally.

Other expedients that have been put forward by various authorities are the further regularisation of shipments, so as to prevent alternate gluts and shortages during the period of the large consignments, encouragement of the highest possible " economic speed " for cargoes, and provision of cold storage improved facilities at all stages of transit from producer to consumer. Such activities are the proper work of an Export Control Board.

MISCELLANEOUS

A Plan for the Development of Agriculture in Colombia.

Ley número 74 (noviembre 30 de 1926) " sobre fomento a la agricultura y a la inmigración ". *Diario Oficial*, Year I, XII, No 20361 Bogotá, 1 December 1926. - *Revista de Industrias*, Vol III, Nos 29 and 32 Bogotá, October 1926 and January 1927

In November 1926 the Congress of Colombia passed a law of which the object was to create as rapidly as possible, a permanent organisation for the development of agriculture

To centralise and direct the movement, a National Department of Agriculture and Stockbreeding is to be formed under the Ministry of Industry. This Department will deal with all questions relating to agricultural organisation, agricultural development, the defence of the economic interests of agriculture agricultural instruction, the working of experiment and demonstration stations, etc

Agricultural instruction as contemplated in the law, which devotes special attention to the question, has two objects

(1) *General instruction* for the purpose of awakening in the mass of the population a love for the land, of pointing out the great agricultural possibilities of the country and of interesting the rising generation in the progress of this important economic factor

(2) *Specialised instruction*, the object of which is to form good agricultural technicians For this purpose the law authorises the establishment of a Higher School of Agriculture, with a good teaching staff, laboratories, a botanical garden, and experiment and demonstration plots, in which the special necessities of Colombian agriculture will be studied.

Elementary agricultural instruction is to be given in the primary schools, urban and rural, and in the technical schools for training artisans. It will consist mainly in teaching the pupils how to handle the principal agricultural implements and how to use and to keep in order small machines

The training schools for teachers, by the addition to their curricula of courses in agriculture and stockbreeding, will be put in a position to train the future instructors

The law also provides for post-scholastic agricultural instruction in the rural schools for boys and girls who have passed through the primary school. The boys and girls who have attended these courses for at least two years will be given a certificate of vocational agricultural study

For practical instruction in agriculture, farm schools will be establish-

ed, which will also be stud farms for horses, sheep and cattle. At these the pupils, by means of courses extending over one or two years, will be able to specialize in one of the principal branches of agriculture, such as stockbreeding, the cultivation of coffee or cocoa, etc. It is considered, too, that it will be particularly useful to form special demonstration stations, which will be given responsibility for the work of demonstrating practically the results obtained through the new processes adopted.

Each district will, moreover, have a special school in which the particular branches of agriculture followed in the district and the particular necessities of the district will be studied. These schools will form the basis of itinerant instruction in agriculture, and the itinerant instructors will be expected to demonstrate practically the results obtained by scientific experimental research, to study the agricultural needs of the various regions and report thereon to the Department, which will take the necessary steps.

The experiment stations will be divided into two classes : 1. the district experiment stations, depending directly on the district organisations and dealing with questions relating to the district ; 2. the national experiment stations which will deal with problems of national importance and will act as the nucleus of practical agricultural instruction. The national stations will be established in localities which are typical as regards both climate and soil, so that agricultural students may find there all the necessary conditions for working to the best advantage. There will be three national experiment stations, namely :

1. An experiment station for the cold region situated in the uncultivated lands of Bogotá. The functions of this station will include the analysis of soil samples sent by farmers, with a view to giving advice as to the most suitable crops to grow, construction of model silos and drafting instructions for their use, the construction of model stables and cowsheds ; experiments and demonstrations in the cultivation of wheat, maize, etc ; cattle breeding, the production of milk and its derivatives ; experiments in the manufacture of fertilisers and in the methods of applying them with a view to popularising their use, etc.

2. The experiment station of the temperate region, the object of which will be to study the cultivation of coffee, which is the commodity most largely exported from Colombia. The methods of preparing the coffee for export will receive special study.

3. The experiment station of the torrid region, which it is believed will in the future make the largest contribution to the agricultural production of Colombia. In view of the great variety of the crops cultivated in this region, the work of this station will be extremely important. Studies and experiments will be made in regard to the cultivation of cocoa, sugar-cane, cotton, rice, maize, tobacco, cocoanuts and many other products.

The foundation of special stations for the study of certain plants and crops the methods of cultivating which are not scientifically understood is also contemplated. At these stations schools for the training of specialists may also be established.

The law also foresees the formation of a national nursery for all varieties of fruit and ornamental trees, of a poultry breeding establishment and of an aquarium for breeding indigenous and foreign species of fish.

An Agricultural Statistical Service, dependent on the Ministry of Industry, is also to be set up and an annual Agricultural Show is to be organised, the Government undertaking to buy a suitable show-ground in the neighbourhood of the capital, to be divided in lots amongst the various sections of the country, which will be required to build on them, at their own expense, pavilions for the exhibition of their respective products.

In order to increase the density of the population, which is at present low in relation to the area, the law prescribes a series of rules for regulating immigration and the colonisation of the uncultivated lands.

As regards immigration, it is laid down that for each immigrant, not less than 18 years old and fitted for agricultural work, who may be introduced into the country at the expense of public bodies, the Treasury shall make a subsidy to those bodies of 30 pesos in respect of the emigrant himself, of 15 pesos for his wife and 15 pesos for each child. The public bodies must, without delay, give work to the immigrants according to the conditions of the contract, under pain of forfeiting their right to the proposed subsidy. The immigrants so introduced will have the right to free transport from the port of disembarkation to the interior of the country.

As to land settlement, the law lays down that the Ministry of Industry shall offer for settlement each year lands of an area to be determined, but not to exceed 100,000 hectares. These lands are to be divided into lots of not less than 80 hectares. In addition, the Government is authorised to buy tracts of land with an area of over 500 hectares situated near the great centres of consumption and to re-sell them in lots not exceeding 50 hectares.

Tracts of uncultivated land near to urban centres which cannot be bought, either because the owners demand excessive prices or for any other reason, may be expropriated by the Government, on the ground of public utility, after obtaining the favourable opinion of three agricultural experts of the Ministry of Industry.

In order further to facilitate the settlement of uncultivated lands, a bill has been drafted for encouraging town workers, who are at present embarrassed by the increase in the cost of living, to take up agriculture. In this bill provisions are proposed for assigning land without delay to applicants. Any person settling and occupying a house on a tract of uncultivated land who grows permanent crops, such as coffee, cocoa, sugar-cane, etc., on an area not exceeding 10 hectares, shall have the right to demand the title to the land so cultivated together with additional land of an equal area. This grant is, of course, subject to the condition that the authorities to whom the application is addressed shall ascertain that the land is actually in the required conditions. The authorities must report on the matter to the Ministry of Industry which must give

its approval within a period of ten days. The ministerial decision will have the effect of a definite transfer of the property, equivalent to a public deed of transfer, and it must be registered in the transfer registry office.

The Government will facilitate the settlement of uncultivated lands by grants of money, implements or seeds, setting aside a sum of 50,000 dollars for this purpose.

The Decisions of the VIth Assembly of the U. S. S. R. Soviets on the Basic Problems of Rural Life.

Экономическая Жизнь (*Economic Life*), No 95. Moscow, 29 April 1927

The Assembly of the Soviets of the U S S R, the supreme legislative body, which meets once every two years, at its fourth meeting in April 1927, came to the following decisions as regards future development in the light of the results already achieved in the economic life of the rural districts

It was recognised that satisfactory farm management, the development of rotations, the introduction of the cultivation of industrial crops, etc, depend upon the good condition of the farms and the Assembly therefore considered that it was necessary to complete the work of organisation in the principal rural districts within a period of ten years and to recommend the Government to take adequate steps to enable this to be accomplished. It was also recognised that it was essential that for this purpose there should be an extension and cheapening of credit and that the smaller farms should be exempted from the payment of contributions for the work of organisation, the expense being borne by the State budget. Furthermore it was desirable that there should be an increase in the allocations for the development of improvement works and of associations which carry out such works and that indemnities should be allowed to the farmers for their expenditure where they no longer benefit from these improvements by reason of migration, subdivision of lands, etc. The Assembly called on the Government to consider the question of the ways and means of indemnifying those undertakings which give compensation to farmers who have not derived any benefit from expenditure incurred on land improvement.

While fully approving the measures already adopted by the Government for increasing rural credit and strengthening the general financial position, the Assembly was of opinion that it was necessary that in the future this credit should be still less costly and for longer terms and that at the same time should be made more accessible and advantageous for the general mass of the peasants.

It was urged that the attention of all central and local bodies should once again be directed to the question of rural co-operation State assistance being guaranteed particularly for small and medium sized undertakings. In this connection it was desirable that there should be an increase in the measures taken for the development and establishment

of collective forms of land-management, more particularly by extending the simpler forms of co-operative societies, including associations for joint cultivation, the joint use of machines, etc., and by encouraging co-operative methods in the marketing of agricultural products.

As regards the improvement of economic and trade conditions for the peasants and the possibility of establishing direct relations between the rural economic life and the state industrial system, it was of paramount importance to arrange that more scientific methods should be adopted in the distribution of goods, to encourage the reduction of trade costs and also of exaggerated profits, while constantly endeavouring further to decrease the difference between the prices obtained by the producer and those paid by the consumer. In the future it will be desirable to pursue a policy not of raising rural prices, since this course would make the prices of industrial products still higher, but of reducing the cost of industrial production with a consequential lowering of the prices of manufactured goods. Such a policy was the sole means whereby any perceptible rise in the standard of life for the peasants and improved conditions for rural production could be brought about.

The assembly recommended that increased attention should be given by all local bodies to road-making and the improvement of main traffic roads, rural, accommodation and other roads, which are of importance for the work of the farm. The proper regulation and development of the road system was one of the most essential conditions for the increase of the trading capacity of the peasant.

Recognising that for the industrialisation of the country and the re-establishment of rural economic life, the development of exportation and importation on the basis of a State-monopoly for foreign trade is of the highest importance, the Assembly considered that it was essential that the provisions for the extension and the improvement in the quality of agricultural production intended for exportation should be further strengthened.

In order that the output of peasant farms may be increased it was desirable fully to develop the industrial enterprises by which raw materials are transformed, such as sugar, starch, bacon, butter, tea and similar factories and also to speed up the construction of elevators and refrigerating plants and to extend the use of electricity and electric methods in the country.

The Assembly approved the decision of the Government with reference to the inclusion in the budget of a sum of 27 million roubles for the purpose of encouraging home colonisation and recommended that in future years this allocation should be increased.

In conclusion the Assembly called the special attention of all the Soviet bodies to the necessity that the interests of the rural proletariat should be effectively protected in all grades by encouraging the growth of its vocational organisation and securing larger representation for it in the public administration in general and in particular in the institutions which deal with social questions in country districts.

THE SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL AGRONOMY AND TEMPERATE CLIMATE CROPS

Agricultural Conditions in Norway.

BJANES, Norwegian Agriculture, Oslo, 1926 J W Cappelen

Professor O T. BJANES, Director General of Norwegian Agriculture, describes the natural conditions influencing the development of agriculture in Norway. Out of the total area 70 % is mountainous and unproductive, 22 % is wooded and only 3.5 % (about 1,675,000 acres) is under cultivation. The cultivated area includes 639,000 acres of arable land, the remainder being meadow land. There are also 681,000 acres of natural pasture. Owing to the predominance of pasture land, the Norwegian farmer is primarily engaged in the rearing of live stock. A considerable amount of information is given by Professor BJANES who describes the native breeds of horses, cattle, sheep, pigs, and gives some account of the Government measures framed for the improvement of live stock production.

Two of the other sections of the pamphlet relate to education and to forestry. More than one third of the inhabitants of Norway are engaged on farm and forest holdings and the Norwegian farmer is usually owner of the land he cultivates. Of the 248,000 holdings, less than half can be regarded as farms in the true sense, seeing that the average area under cultivation is only about 7 acres per owner. More than 92 % of these holdings have under 25 acres of cultivated land and only 26 farms have more than 247 acres, taking arable and meadow land together. Most of the farmers own more or less considerable stretches of mountain pasture, forests, etc. serving as a supplementary source of income to the owner, if not constituting the main part of his returns.

The Education of Present and Future Farmers.

Farming in South Africa, Pretoria, 1926, Vol 1, No 9, pp. 344-346

This report shows the steady advance in the practice of agriculture under government guidance.

I. *The Schools.* — The five schools of agriculture have recently been brought under government control and are directly under the Division of Agricultural Education and Extension. This division is responsible for all public agricultural education work including research, publications and advice to farmers on agricultural matters, and works through its officers, both at the schools and elsewhere.

II. *Extension Schemes.* — Extension officers have done much to organize farmers into rural societies aiming at the dissemination of knowledge on agriculture and allied subjects. The duty of these officers is broadly : — (1) to find out the immediate problems of general interest, (2) to carry out practical demonstrations in collaboration with the farmers, (3) by a close connection with the schools of their area to keep the farmers in touch with the latest advances in agricultural practice. Other most successful enterprises are : — a demonstration train, which proved popular especially in the small centres, — demonstration plots worked at many rural schools by the school children under supervision, — sericulture started in certain limited areas — a home economics section trying to demonstrate the possibility of rational comfortable existence in the country and to form lasting home economic clubs competent to run alone in every area.

III. *Sheep and Wool.* — This section is now under the same Division. It possesses 18 officers, 6 being at the schools. The following among other problems have been undertaken : — advertisement, breed improvements, wool classification, false packing complaints, unification of wool growers' associations, quality of clip, wool impurities, improvement of native breeds, vermin proof fencing, blowfly prevention.

Experimental Work in Malaya.

Annual reports of Heads of Divisions *The Malayan Agricultural Journal*, Kuala Lumpur, 1926, Vol. XIV, No. 6, pp. 132-200

This Journal contains all the reports sent to the Department of Agriculture of the Federated Malay States and Straits Settlement by the Chief Divisional Officers.

The reports are mostly devoted to experimental work in connection with the most important crops of the Malay States

Experimental Work. — The principal object of the Experimental Plantation at Serdang is the testing out of the following crops : —

Fodder grasses, pine apples (of which a collection has been made from various part of the Tropics with the object of selecting improved types) — ipecacuanha (which has given positive results, it having been shown that the roots contain sufficient alkaloids to meet the standard requirements of the British Pharmacopoeia) — tobacco (for the extraction of nicotine content) tuba (*Derris* spp.) — annatto — chaulmoogra (*Hydnocarpus Wightiana* and *Taraktogenos Kurzii*) — sugar-cane — gambier — plants producing essential oils, fibres, etc. — malau or Malayan lac, produced by an insect similar to the lac insect of India on the bark of certain native trees, etc.

Experimental plantations of quinine and tea have been established and preparatory studies have been made for selecting areca nuts, Brazil nuts (*Bertholletia excelsa*) etc. at the Kuala Lumpur Experimental Plantation; at the Castleton Estate of Teluk Anson rubber is mostly cultivated; at the Experimental Plantation, Cameron's Highlands, an Experimental Plantation has been started for the cultivation of hill products such as *Cinchona*, tea, coffee, sub-tropical and temperate fruits and vegetables.

Rice. — At the Malacca Station experiments in methods of cultivation and selection are carried out and also at the Test Stations of Pulau Gadong (Malacca) Permanang, To' Jaya (province of Kuala Lumpur), Talang (Kuala Kangsar district), Dong (Pahang State) and specially at the Titi Serong Rice Experiment Station.

At the latter station 26 selected strains from the Krian district were subjected to yield tests to meet the demand for seed suitable for dissimilar soils and other conditions.

In 1925 about 30,000 acres were planted with strains originally obtained from the Titi Serong, and it is anticipated that there will be a rapid increase in planting with improved races.

Fibres. — Studies and investigations have been made on Manila hemp " (abaca) ", wild banana fibre, sisal, bark fibres including " terap " (*Artocarpus Kunstleri*), " tutor " (*Hibiscus macrophyllus*), " baru " (*Hibiscus floccosus*), nipah palm fibre, etc. Tests made with " terap ", " baru " and " tutor " show that they provide a good, white pulp, suitable for paper making.

Cotton. — Trials plots of Sea Island cotton in the province of Wellesley and in the Johore, Pekan and Kurantan Districts of Pahang indicated that the cultivation of this crop on a large scale was unlikely to prove successful owing to its liability to the attack of pests.

Coconuts. — There is a general increase in the production of coconuts except in the Pahang State. The best coconut areas are to be found on the rich clay soils of the West Coast of Johore, whilst those on peaty land generally show a tendency to become less productive at an early age. At the Coconut Experiment Station of Klang selection work has been started with high-yielding palms of the tall and dwarf races. There is a wide variation of production (from 5 to 150 nuts per annum) but the good producing trees on the average remain proportionately good yielders from year to year and vice-versa.

Palm Oil. — The most satisfactory method for the bleaching of palm oil appears to be heating for about 15 minutes at about 240°C. It has also been found that the slightly disagreeable odour left after bleaching can be reduced by passing steam through the bleached oil.

Essential Oils. — Samples of " minyak medang losoh " (*Cinnamomum parthenoxylon*) and of " minyak sepetir " (*Sindora* spp.) have been

examined. The former is obtained from the roots of the tree and consists chiefly of safrol ; the latter consists principally of sesquiterpenes and may have a value as a paint or varnish solvent.

Rubber (Hevea brasiliensis). — The studies and investigations in connection with rubber were as follows :— a standard method of procedure for the estimation of the rubber content of latex ; effect of alternate tapping periods on rubber (the rubber obtained from trees tapped after a long period of rest has a very slow rate of vulcanisation, which after about three or four weeks settles down to a constant and more rapid rate for the latex obtained ; effect of alkaloids on rubber (alkaloids when mixed with rubber have a marked effect in accelerating the rate of vulcanisation) ; variations in tensile strength (the presence of small proportions of soil particles does not affect the fortuity of the breaking point and only in some cases decreases the tensile strength), formic acid coagulation (economy would probably be effected by using formic in lieu of acetic acid).

The true cause of depreciating yields of latex in old rubber areas lies not in the age of the trees but in bad environmental conditions, such as soil erosion, bad soil moisture conditions, severity and bad methods of tapping and diseases. The oldest rubber trees in Malaya are 48 years of age. Therefore it has not been possible so far to determine the normal commercial life of a rubber tree.

On estates in the Selangor Plantations trees show a remarkable increase in the yield of latex ; in Perak results are poor owing to budding on two-year old stock which is too old to give successful results.

Cover crops have been adopted successfully in order to prevent soil erosion, and *Calopogonium mucunoides*, *Vigna oligosperma*, *Centrosema pubescens* have given good results in this connection.

Jelutong. — As a dry coagulum the use of sodium silicofluoride which is a cheap and efficient coagulant is recommended. It has been found that dilution of the latex has a marked effect in retarding or inhibiting coagulation.

Power Alcohol. — Apart from nipa palm and bye-products such as cane molasses, tapioca appears to be the most promising source of raw material for the manufacture of power alcohol.

Two or three crops can be grown every year as catch crops without affecting the subsequent value of the land for other permanent cultivation, provided soil erosion can be prevented and possible losses of potash and nitrogen are replaced.

Notes on a possible Interpretation of certain young Plant Forms.

SAVELLI, R. *Archivio Botanico*, Forlì, March, 1927. V. III, fasc. 1, p. 1-14.

In the present note the author considers in a general way the possibility that in some special cases the difference shewn by some species

between their young and adult forms, and the relative physionomic change which comes with age, may be both the result and the indication of the hybrid origin of the species in question.

Interspecial hybrids lend themselves to the observation of this phenomenon much better than varietal hybrids, *i. e.*, hybrids between the typical form of a given species and its varieties, the former permitting of staurogenesis, *i. e.*, of the formation, by hybridization, of new races having the value of species.

A Physiological Study of the Effect of Light of various Ranges of Wave Length on the Growth of Plants.

POPP, H. W. *American Journal of Botany*, Lancaster, Pa., 1926, Vol. XIII, No. 10, pp. 706-736.

Greenhouse experiments, during which numerous observations were made, temperature registered etc.

The source of light used was ordinary daylight from which different parts of the spectrum were screened out by the use of different kinds of glass.

A quartz spectrograph was used to determine the actual range of wave lengths which each glass transmitted.

The exact range of wave lengths in the visible and ultra-violet transmitted by the various glasses used are given.

The spectral range varies between 290 and 720 millimicrons. That of No. 1 house varied between 312 and 720, of No. 2 between 296 and 720, of No. 3 between 389 and 720, of No. 4 between 472 and 720 and of No. 5 between 472 and 720.

Judging from the relative transmission curves of the different glasses given in the article, it is as well to point out that the spectra of these light were very discontinuous.

The following plants were used:—*Nicotiana tabacum*, *Daucus carota*, *Petunia hybrida*, *Helianthus cucumerifolius*, *Soja Max*, *Mirabilis Jalapa*, *Coleus Blumei*, *Fagopyrum vulgare*, *Lycopersicum esculentum*, *Holcus sorghum sudanensis*.

Among the results noted are the following:—

In houses 4 and 5, where the entire blue end of the spectrum was eliminated, the plants were decidedly etiolated. The leaves of the tomato (*L. esculentum*) were examined under the microscope. Those in the first two houses appeared to be normal, those in the third house seemed thinner and shewed vacuoles, phenomena which were even more obvious in those of No. 4 house and especially of No. 5 where the cells of the palisade parenchyma were no longer in contact with one another.

No differences were observed in the rate of germination of seeds in the different houses.

After germination the rate of stem-elongation was uniformly greatest in all species for the first 2 or 3 weeks only in houses 4 and 5.

Briefly, when plants were thus grown in daylight from which all wave

lengths shorter than 529 μ were excluded, they developed the following modifications :

- (1) An increased rate of stem-elongation of all species during the first two or three weeks growth ;
- (2) A considerable decrease in thickness of stems ;
- (3) A reduction in the number of branches or side shoots ;
- (4) A general curling or rolling of leaves ;
- (5) A good chlorophyll development, but a reduction of anthocyanin in leaves and flowers ;
- (6) Less differentiation of stem and leaf tissues, and a reduction in strengthening tissues ;
- (7) Considerable delay in time of flowering and reduction in the number of flowers produced ;
- (8) Very weak development of seeds, fruits and general storage organs ;
- (9) Decrease in fresh weight and dry weight and increase in percentage of moisture ;
- (10) Considerable decrease in total carbohydrates and generally an increase in total nitrogen ; often an increase in soluble nitrogen compounds.

Importance of Calcium to the Growth of Roots.

MEVIUS Walter, Kalzium-Jon und Wurzelwachstum. *Jahrbucher für wissenschaftliche Botanik* Leipzig, 1927 66 Band, Heft 2. p 183-253.

This exhaustive study deals with the experiments made on young plants of *Pinus Pinaster*, *Zea Mays*, *Onobrychis sativa*, *Lupinus luteus*, *L. albus*, *L. angustifolius*. For some of these plants (*Onobrychis*, *Lupinus*) calcium is indispensable ; for others, the quantity of this element required, if not less marked, is governed by certain conditions and depends on certain other mineral elements, the concentration of the hydrogen-ions, etc.

Contribution to the Study of the Action of Copper Sulphate in the Soil on Growing Plants.

MONTEMARTINI, L. Contributo allo studio dell'azione del solfato di rame nel terreno sopra la vegetazione. *Rendiconti del R. Istituto Lombardo di Scienze e Lettere*, Milan, 1927, V. LX, fasc VI-X.

Observations on the action of copper sulphate when applied to the soil have been scanty and conflicting. For example, experiments by Masayasu KANA (*Journal of the College of Science*, Tokyo, 1924) on beans and peas, showed a stimulation of plant growth when the soil was watered with a very dilute solution of sulphate of copper, but according to SIMON (*Landwirtschaftliche Versuchstationen*, v. LXXI, 1909) even small quantities of the solution are harmful to the growth of mustard and oats. It has in consequence been the author's wish to make a fresh contribution to the study of the question by observations, made at different times of

the year, and therefore under different conditions of temperature and illumination, of the growth of the hypocotyl axis of the young plants of Giant Russian sunflower both in the dark and in the light, in the presence and in the absence of small quantities of sulphate of copper (watering with solutions of 0.03-0.09 per 1000).

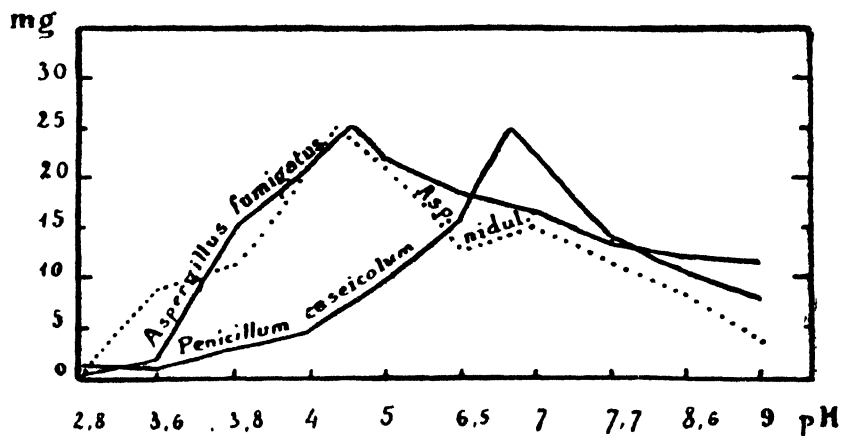
The effect of sulphate of copper is expressed for individual experiments by the relation between the lengthening of the hypocotyl axis of the plantlings treated with copper sulphate and that of those not so treated. In general the growth was greater than on the control plant in the first phases of growth, and less in successive phases.

The increase in growth rate induced by copper sulphate is more evident in the dark than in the light at higher temperatures; it was greatest with a solution of 0.08 per 1000. The results can be explained by admitting a double action of the copper salt; one on the movement and on the better utilization of the reserves contained in the seed, and the other on their circulation inside the germinating plants.

Optimum H-ion Concentration of Culture Media for certain of the lower Fungi.

SARTORY, A., SARTORY, R., MEYER, J. — *Bulletin des sciences pharmacologiques*. Paris, 1927, t. XXXIV, 29a., n° 2, p. 75-79, 7 fig.

A series of 10 culture media were prepared with pH varying from 2.8-9.0. These were impregnated with the following kinds of fungi: —



Relation between growth (ordinate) and pH values (abscissa) for *Aspergillus fumigatus*, *A. nidulans*, *Penicillium caseicolum*.

Aspergillus fumigatus, Fresenius; *Penicillium brevicaulis*; *P. caseicolum*, Bainier; *Aspergillus* (*Sterigmatoc.*) *nidulans*, Eidam; *S. glutescens*, Bainier.

No growth was seen at a pH of 2.8. The most suitable media were those with a pH between 3.8 and 8.6. with optima concentrations, as may be seen by examination of the graphs showing the speed of growth.

The concentrations are shewn on the abscissa and the weight in mgm. on the ordinate axis.

It was noted that organisms with the most primitive reproduction apparatus grow best in a nearly neutral medium, whilst the more pronounced the differentiation in reproduction, the more closely does optimum speed of growth follow acidity. There is in fact here some connection between reproduction and the H-ion concentration of the medium. We reproduce a graph for 3 of the kinds observed.

Formation of Vitamin B by *Bac. vulgatus* (Flügge) Migula from Vitamin-free Nutrient Solution.

SCHUENERT A and SCHIEBLICH M, *Biochemische Zeitschrift*, Berlin, 1927, Bd 184, Heft 1-3, S. 58-66.

The writers had previously carried out a number of experiments which indicated the capacity of *Bac. vulgatus* (Flügge) Migula, a spore forming soil bacillus, very common in the alimentary canal of herbivores and in fresh and dried plant foodstuffs, to form vitamin B from vitamin-free nutrient solutions.

The experiments however had hitherto never been carried out with nutrient solutions which were beyond doubt free from every trace of vitamin, and in consequence the writers considered it expedient to repeat their experiment on a nutrient solution which, apart from mineral salts and synthetic malic acid, contained glucose derived from maize starch which in animal experiments had been found free from vitamin B. Experiments on rats shewed that *Bac. vulgatus*, cultivated on this nutrient solution and then dried, sufficed in amounts of 0.2 to 0.4 gm. per day to produce enough vitamin B for growing rats to support growth during the 62 days of the experiments. This bacillus is thus proved to have the power of forming vitamin B from nutrient solutions deficient in vitamin B.

Seed Selection as a Factor in the Improvement of the Yield of Crops.

NILSSON-EHLIN, H Sveriges spannmålsodling och dess framtidsutsikter Paper read during the Agricultural Week in Stockholm, 1927 *Svenskt Land*, Stockholm, 1927, No 7, p 165

During the last forty years (1881-85 to 1921-25) the area under cultivation in Sweden has increased by 27 %, and the yield measured in food-units, by not less than 64 % (1). Calculating the value of one food-unit at 15.7

(1) 1 food-unit = the fodder value of 1 kilo barley.

öre, the average value per year of the entire harvest for the five-year period 1921-25 amounts to 1000 million crowns and for the cereal crops alone to 400 millions, more than 100 millions of the latter sum being the result of the crop-increase during the last four decades. According to the calculations of Professor Nilsson-Ehle this increase, to the value of 70 million crowns, is due to the extension of the area under crops and to the improvement in manuring and cultivation methods, while Swedish seed selection work accounts for 37 millions.

If it be reckoned that, out of the average annual value of the crops other than cereal crops, a further 13 million crowns may be attributed to Swedish seed selection work, it will be realized that the annual profit of 50 millions is an exceedingly satisfactory result on an outlay of 2 ½ millions, the total sum allowed by the State up to the present for this particular branch of research.

Report on Research Organization in Agricultural Technology in Czechoslovakia, in 1924-1925.

Veröffentlichungen des Ministeriums für Landwirtschaft in Prag, XII Weinberge, 1926

Besides research work carried out in the years 1924 and 1925 in Czechoslovakia, the book describes also earlier work and includes a historical survey. The organization of agricultural technology research in Czechoslovakia is clearly shown by these illustrated reports. The reports embrace scientific water-supply, drainage, and irrigation. In addition there are numerous illustrations and appendices, and a summary in French and German.

Land Improvement Schemes in the " Agro Romano " and the " Agro Pontino " Italy.

MARIANI Mario, Come si svolge la bonifica agraria dell'Agro Romano e Pontino *Nuovi Annali dell'Agricoltura*, Rome, 1927, an VII, n° 1, pp 17-28.

The " Agro Romano " or Roman Campagna represents alone an area of 188,000 hectares of agricultural land, which form part of the commune of Rome. The neighbouring territories comprising the " Agro Pontino " or Pontine Marshes, the upper Tiber valley, the communes of Anzio and Nettuno, must be considered at the same time, as the recent law on the reclamation of lands suitable for agriculture apply equally to the Campagna and to these adjacent regions.

Land improvement loans at 2 ½ %, loans repayable over a period of 45 years, 10 year exemptions from taxes on new buildings and various other advantages and subsidies have, at first gradually, brought into use the Campagna and have changed its face during the last 25 years.

The sheep pastures were on a subsoil of partly decomposed volcanic tufa, which only needed a simple breaking up into small pieces and then

into fine particles to form an excellent soil for crops, provided that powerful enough implements could be found for dealing with the subsoil. In 1912 the FOWLER subsoil ploughs appeared on the scene. They worked to a depth of 70-80 cm. and broke up the layer of "pan", meantime distributing the debris in a suitable state for further disintegration in a mellow, loose soil to which they brought rich fertilizing elements.

After such a subsoiling the soil had naturally then to be put down to a rotation with cereals, then lucerne, etc.

The war stopped this movement for developing the Campagna, but recent legislation (1919-1921, etc.) did not confine itself to assisting improvement schemes but actually made them compulsory. The State extended the road system, developed the improvement scheme on 140 000 ha., made rural settlements and instituted a network of electric power supply. It increased the number and importance of credit loans and finally widely inculcated through its agricultural instructors the best principles of agricultural practice.

This systematic reclamation, due to legislation seconded by sound technique, the good results of which have been proved on thousands of hectares of late years, will bring about a real agricultural revival and also a repopulation of the zones which hitherto have consisted of moors and marshes. The last are being increasingly curtailed by the formation of canals and other drainage schemes, and their reclamation means a gift to agriculture of fresh, very rich lands, which will form a fair aureole for the Eternal City.

A satisfactory Crop Rotation in use at Ancona, Italy.

BATTISTELLI Emanuele. Un'ottima rotazione. *La Terra*, Bologna, 1927. an. III, n° 3, p. 131-132.

The following rotation was introduced by the author of this article on the Marotti estate, at Montemarciano (Ancona): 1. cleaning crop — 2. wheat — 3. clover — 4. wheat — 5. lucerne — 6. lucerne — 7. lucerne — 8. wheat — 9. wheat.

Primer of Soil Science.

FREBOLD, G. With 29 illustrations and 2 tables. *Bücherei für Landwirte*, published by H. v. Lengerken. 166 pp. Walter de Gruyter & Co., Berlin-Leipzig, 1926.

The contents of the book are: -- meaning and scope of soil science: formation and theory of the earth crust; geological periods and the formations produced by them. Composition of the earth crust. Weathering processes; changes brought about in soil by plants: soil chemistry and soil physics; distribution and extent of different types of soil, geologic-agronomic soil maps.

The Formation of the Earth's Crust as the Basis of Soil Science.

MILCH, L. 2. Ungearbeitete Auflage der Grundlagen der Bodenkunde, Franz Deuticke Leipzig-Vienna, 1926, S. 254.

The introduction and the first part of the book give a glimpse of the method of origin of minerals, the earth's crust, the interior of the earth, the common characteristics of the constituent particles of rocks and soils, their chemical and physical peculiarities and observations with the polariscope.

The second part deals with rocks and their constituent parts, their weathering and disintegration. The existing theories on these processes are thoroughly expounded with examples. Sedimentary rocks and crystalline schists conclude the section.

Part 3 discusses the relations between the composition of soils and the nature of their mother rock, soil formation from different rocks, the effect of different forces on soils and climatic soil zones.

As the author says in his preface, the firm conviction that the greatest importance must always attach to a mineralogical petrographic basis for soil science opens the way to new methods, and the necessity is proved of making this new field of enquiry accessible not only to land owners but also to geographers and biologists.

The book is short and the style very clear. It deserves the widest circulation.

Treatise on the most important Kinds of Soil Based on the Latest Researches on their Petrographic-Geologic Composition.

NIKLAS, H and GOETTING, A *Zeitschrift für Pflanzenernährung und Düngung*, 1926, Bd. VI, A, Heft 5

In this book there are given the results of mineralogical-petrographic examinations of soils taken especially from the alluvium and diluvium of southern Bavaria. The soil skeletons of about 600 soils, *i. e.* soils from which the clay particles have been removed by washing, were examined under the microscope. The following are described: soils from alluvial sands and from river terraces; soils from high terraces (weathered soils and soils from the upper loam layers); diluvium soils from the lower terraces, including soils from the fluvial covering of the lower terraces, and soils of the moraines and their upper layers.

Do Colloids Exist as a Coating Around the Soil Grains?

BOUYOUCOS George John (Michigan Agriculture Experiment Station), *Soil Science*, Baltimore Md., 1926, vol. XXI, pp. 481-487.

Boyucos presents data showing that colloids in soils do not exist as coatings around the grains only. The problem has been studied by two methods: first, by optical examination; and secondly, by the heat of

wetting method. The results indicate that colloids exist also as independent components, either pure or containing different amounts of impurities and scattered irregularly throughout the soil mass.

The Moisture Equivalent of Soils.

THOMAS, Moyer D, and HARRIS, Karl (Utah Agricultural Experiment Station), *Soil Science*, Baltimore Md., 1926 vol XXI, pp. 411-424.

A study of the moisture equivalent method as it is influenced by the amount of material centrifuged ; by the texture and chemical treatment of the soil ; and by the nature of the outside boundary, leads to the following conclusions :

(1) Increasing the size of sample reduces to a slight extent the amount of water retained in very coarse and very fine soils, whereas soils of intermediate texture show greater effects.

(2) The moisture gradient in the soil mass, opposing the centrifugal force of the machine, shows a similar maximum with intermediate textures. Very fine grained soils have a nearly uniform moisture distribution at equilibrium.

(3) A period of many hours centrifuging is often required to establish capillary equilibrium in the case of heavy clays and very fine silts. The slow movement of water through a silt is shown graphically.

(4) When 10 to 25 gm samples are centrifuged, silt of about 0.10 mm. average diameter retains more water than silt of 0.05 mm. average diameter. This excess of water decreases with the increasing size of the sample.

(5) The very fine silts have a lower apparent specific gravity than the heavy Trenton clay, and also retain as much or more water. It is suggested that the capillaries in the silt which the centrifuge is unable to empty are filled entirely with water, whereas in the clay the corresponding interstices contain some colloidal material.

(6) As the capillaries of the outside boundary are reduced in size, the adjacent soil becomes drier and this reduction in the moisture content is reflected throughout the whole soil block. This effect conforms quantitatively to the thermodynamic theory of capillary equilibrium.

(7) When the replaceable base of a clay is entirely sodium the impermeability, and probably also the equilibrium moisture retaining power, are greater than when the replaceable base is potassium, ammonium, calcium, aluminum, or hydrogen. The colloidal swelling is enhanced by the sodium in the complex.

The Loss of Soluble Salts in Runoff Water.

DULEY, F L (Kansas Agriculture Experiment Station), *Soil Science*, Baltimore Md. 1926 Vol. XXI, 401-409,

After each rain samples of the runoff waters from plots at the Missouri Exp. Station were taken, filtered through clay filters and aliquots stored for analyses. All the samples obtained during a 3 month period were

composited in order to reduce the number of chemical determinations. It was found that:

The total amount of dry salts varied from 166.8 pounds from the plot in wheat and clover to 380.1 pounds per acre from the plot which was spaded 4 inches deep in the spring and fallowed throughout the season.

Calcium and sulphur were lost in larger amounts than any of the other elements determined. The loss of potassium was relatively small but from several of the plots it amounted to considerably more than would ordinarily be applied in commercial fertilizer. The losses of magnesium, sodium, and phosphorus are too small to be of much practical importance.

The nitrogen determinations were incomplete on some of the samples, but these results as well as others reported earlier indicate that the surface runoff water is not a great source of nitrogen loss.

The soluble salts from the fallow plots showed a higher percentage of inorganic material, as indicated by a smaller loss on ignition, than did the soluble material coming from land carrying a crop.

Contributions to the Study of Loess Loam and to Soil Diagnosis.

NIKLAS, R., and GOETTING, A., *Beitrage usw. Landwirtschaftliche Jahrbücher*, 1926, Bd. LXIII, S. 477.

Loess loams from different districts especially from North and South Bavaria were separated into their constituent parts by minute trituration, achieved by the addition of water, in medium depth porcelain vessels, and careful decantation after allowing the sand to settle. These modifications of the ordinary suspension analysis both permitted an avoidance of the sources of error in deduction, which were formerly apt to occur after heating the soil samples or treating them with dilute acids, and also did not seriously affect the form and constitution of the fine sand, but allowed it to remain more or less unaltered. In addition the lengthy and necessarily tedious process in the suspension apparatus was avoided. The resulting disintegrated soils could then be compared as entities, as to weight, as to the distribution of their constituent particles, as to the appearance of their ultimate constituents, and as to their average content in minerals and ores. Soils of similar origin generally possess equal or like proportions of particles of different sizes, the texture and structure of the separate components being surprisingly similar. Soils formed in situ have four-cornered angular fragments, while deposited soils generally have rounded fragments. A general view of the disintegrated soil is consequently an excellent indication of the origin and derivation of a soil.

Influence of Cultivation on the Water Content of the Soil.

BLOHM, G., *Einfluss der Bodenbearbeitung auf die Wasserführung des Bodens* *Kühn-Archiv*, Halle a. S. 1926, Bd. XII, S. 324-422.

In the first part of this work the writer gives a general account of water storage in soil, stressing especially the influence of soil structure

on its water content as very carefully examined in previous laboratory experiments.

In the greater part of this work reference is made to experiments on the trial fields of the "Landwirtschaftliches Institut für Pflanzenbau der Universität Halle a. S.", which were actually carried out for the testing of the effect of cultivation on soil water content. The valuable influence of a continuous proper loosening of the surface on the water content of the soil is shewn, its effect being certainly recognizable as far as the deep subsoil. Comment is also made on moisture determinations on cultivated soil, which show the good effect of hoeing on water conservation. The result is due not only to a decrease of evaporation from the surface layers, but equally to the formation of a loose friable soil structure and consequent decrease in unnecessary percolation, as well as to the formation of a good rain receptivity in the soil. Here again the excellent effect of a proper smooth mulch is noticeable even in the subsoil. Another chapter deals with the gradual increase in soil water content in autumn and winter, and it is noted that the timely turning in of the stubble after harvest helps the progress of rain to the lower layers of the soil. All things considered the total water content of the soil depends on its structural arrangement.

Experiments on the Neubauer Seedling Method.

KROSS, W. Untersuchungen über die Neubauersche Keimpflanzenmethode. *Landwirtschaftliche Jahrbucher*, Berlin, 1927, Bd. LXV, Heft 2, S. 277-330.

The writer made experiments with the NEUBAUER seedling method, his chief object being to determine whether any simplification could be made in the technique of the mass estimations. He was successful in finding that a simplification in the methods of calculation is possible, involving a difference of less than 0.1 gm. in the weight of the grains as against the ordinary control method. The customary counting and weighing on analytical scales can be replaced either by the mere counting of a carefully sifted quantity of grain or better by the loss incurred in weighing on a hand scale without any counting. Accuracy does not suffer in the process.

The writer was also able to find more or less satisfactory answers to certain other questions at the end of his experiments, in addition to those which he had set himself. Among others he established the following facts:— that the size of the rye grains used had a certain influence on the amount of plant food absorbed, that the smaller grains absorbed less phosphoric acid than the larger, but that given equal weights of grain the smaller grains absorbed more; that for graduated numbers of plants the optimum number was really about 100; that monocalcium phosphate in

sand cultures of young rye plants was not so readily absorbed as muriate of potash ; that the absorption of potash as well as of phosphate was increased by giving a complete manuring.

A mathematical formula was established for the amount of phosphoric acid absorbed, agreeing in form with that governing the effect of the growth factors. The writer's investigations indicate the probability that the soil nutrient materials behave differently from the soluble added fertilizers, and that when the latter are given in abundance the soil nutrient materials are not called into use. Finally a seedling experiment with graduated amounts of soil shewed that the best use of the soil nutrients was made in the smaller amounts of soil.

A study of the Factors influencing the Efficiency of different forms of Nitrogen as related to Soil Type and Cropping System in the Atlantic Coastal Plain Region : Part I.

SMITH, A. M. University of Maryland. *Soil Science*, Baltimore, 1927, Vol XXIII, No 2, pp 137-164

The soil on the Atlantic Coastal Plain is mainly sandy. A considerable amount of market gardening is done and hence there is great demand for nitrogenous fertilizers especially in a form which will not too quickly leach out of the soil.

The author first gives a short historical resumé of the work already done on (1) Factors influencing the rate of nitrification under the following headings:— effect of temperature on nitrification, moisture relations, loss by leaching, effect of soil reaction, the influence of salts on nitrification, the influence of the source of the nitrogen on nitrification ; (2) Plants as indicators of the availability of nitrogen from various materials ; (3) Nitrification as a measure of the availability of nitrogen for plant growth. He then deals with his own experimental work on Norfolk sandy loam soil in which he aimed at a " Comparison of various nitrogenous fertilizer materials with respect to the rate of nitrification and the leaching of nitrates ". His experiments were arranged in 3 series.

Series I. *The influence of soil moisture on the rate of nitrification.* The following fertilizers were used :— Dried ground fish, packing house tankage, sewage, urea, sulphate of ammonia, nitrate of soda. These were added to soil in pots together with enough phosphate and potash to form a complete fertilizer, containing 7 % ammonia, 6 % phosphoric acid, 5 % potash, in amount equivalent to 2000 lbs per acre. Moisture contents of 10 up to 70 % of the water-holding capacity of the soil were used for each of these fertilizers and the nitrification measured during a little more than 3 months.

Series II. *The influence of soil temperature on the rate of nitrification.* — This experiment was carried out in pots having a moisture content of

50 % of the water-holding capacity, replenished twice a week, and placed in the different temperatures of a cold room, a shaded greenhouse, an unshaded greenhouse, a warm rose house.

Series III. *The leaching of nitrates as influenced by various nitrogenous materials.* The duration, periods of sampling, soil, analysis and rate of application of the fertilizer were the same as in the other series. Slightly conical glass percolation cylinders, enclosed in a large wooden case, were used and the leachings measured.

The conclusions reached were the following : -

(1) The optimum soil moisture content for nitrate production from the 7-6-5 complete fertilizer used varied between 50-60 % of the water holding capacity.

(2) Nitrate accumulation from urea at 70 % of the water holding capacity was specially noticeable.

(3) After the first period of rapid nitrifications, the fluctuations of nitrate nitrogen appear to be the result of microorganisms rather than of differences in moisture content, temperature or reaction.

(4) Up to 30°C, the highest temperature used, nitrate production increased directly with the temperature

(5) At all temperatures urea nitrified most quickly : at all except the lowest, sulphate of ammonia gave the highest ultimate accumulation of nitrate.

(6) When both rate of nitrate production and of nitrate accumulation are considered, the materials used ranked as follows - nitrate of soda, urea, sulphate of ammonia, dried ground fish, tankage, activated sewage sludge.

(7) The leaching of nitrates after an application of a 7-6-5 fertilizer (2000 lbs per acre) varied with the proportion of nitrogen supplied as nitrate of soda

(8) When used as the sole source of nitrogen in this ratio the totals of nitrates leached from sulphate of ammonia, urea, dried ground fish, and tankage were much the same. There are many tables and a full bibliography.

The Use of Oat Straw in a System of Soil Fertility.

THOMAS, Royle P and HARPER, Horace, J. (Iowa Agriculture Experiment Station), *Soil Science*, Baltimore, Md., 1926, vol. XXI, pp. 393-400.

The authors report a series of experiments on the effect of the application of oat straw on the accumulation of nitrates in soil when applied alone or in combination with red clover, Hubam clover, NaNO_3 , and $(\text{NH}_4)_2\text{SO}_4$. Four gallon pots were used in these experiments with two

types of soil: Webster Silt loam and Carrington loam. The straw was cut into one inch lengths and applied at the rate of $\frac{1}{2}$ to 1 ton per acre. The same amounts of clover were added to some pots.

The addition of oat straw to the soils did not effect appreciably the accumulation of nitrates in them.

Wheat was also grown in one series of pots filled with Webster silt loam. Although no effect of the various treatments was noticeable in the development of the plants, the soil treated with oat straw alone yielded less than untreated soil.

A study of the nitrate accumulation in field soils to which oat straw had been applied and turned under with the second growth of red clover, Hubam clover, and alfalfa indicated that no retardation occurred except in that portion of the soil immediately in contact with straw which was not mixed with the legume.

The effect of additions of oat straw alone and in combination with red clover and Hubam clover to a Carrington loam had no retarding effect on the growth and yield of corn.

Without causing any injury to crop growth and yield, straw can be returned to many corn belt soils by spreading it on the second growth of red clover and by ploughing in the fall wherever possible. The rate of application should not exceed one to one and one-half tons per acre.

The effect of large applications of straw on the growth of crops may be physical rather than biochemical since the straw reduces the nitrate content of only the soil in immediate contact with it.

Relation of Fineness of Grinding to Rate of Sulphur-Oxidation in Soils.

STEPHENSON, R. E. (Oregon Agriculture Experiment Station). *Soil Science*, Baltimore Md., 1926, Vol. XXI, pp. 489-493

The author studied the rate of oxidation of different grades of crude sulphur, according to fineness of grinding. Three different soils were used in this study, all rather coarse in texture and carrying a good proportion of sand. It has been found that:

(1) The more finely sulphur is ground, the more rapidly it is oxidized. Sulphur ground to pass through a 50-mesh sieve should contain enough fine material to satisfy the most urgent needs for soil use.

(2) The oxidation of sulphur increased acidity or neutralized alkalinity on alkaline soils.

(3) The acid produced from the oxidized sulphur brings calcium into solution rather freely.

The Utilization of sour Podsol and marshy Soils on Clay Subsoil.

J WIRYN Mežsaimnizcibas rakstu krajums IV. Riga, 1926, p. 125-133.

His observations have led the writer to the opinion that forests are most likely to flourish on strong podsol and gley soils and to make use of their necessary foodstuffs. But marshy ground may occur also at higher levels with consequent deterioration of the quality of the forest, where the large amounts of lime and of other foodstuffs carried down by the water are not replaced. Such soils under pasture or meadow without irrigation and manuring soon show a diminished return, and if brought under the plough they lose their productivity even more quickly. The writer suggests that the chief reason for this phenomenon lies not in the impoverishment of the soil in foodstuffs, but in the ill effects of meadow and pasture soil characteristics, the influence of precipitations on cultivated soil being particularly bad. The bad structure of forest soil is slightly improved by the remains of dead plants and insects and by the burrowing of earthworms, all of which promote the circulation of air and water. When the soil is cultivated these processes vanish and it is to be noted that young forest plantations generally do not grow so well as nature sown forest trees. The writer recommends the use of gypsum for the improvement of these soils by reason of its strong coagulative capacity.

The Water Economy of the Chalk Flora of England.

ANDERSON L. *The Journal of Ecology*, London, 1927, Vol. XV, No. 1, pp. 72-129.

This important study comprises observations and investigations regarding the distribution of rain over the chalk region dealt with, followed by remarks on the absorption of water by the various soils and the penetration of the water by capillary action.

The rooting depth and the maximum root development of certain plants is shown by diagrams. The root systems of various plants are illustrated by figures, for example, *Fragaria vesca*, *Gentiana amarella*, *Linum catharticum*, *Ophrys apifera*, *Polygala vulgaris*, *Plantago lanceolata*, *Anthyllis vulneraria*, *Daucus carota*, *Medicago lupulina*, etc. Each illustration gives the depth of penetration of the roots, which may extend, (as in the case of *Galium verum*) to 30 inches.

A table of the volume of soil exploited by the root systems of various plants gives the following areas in cubic inches for certain species :

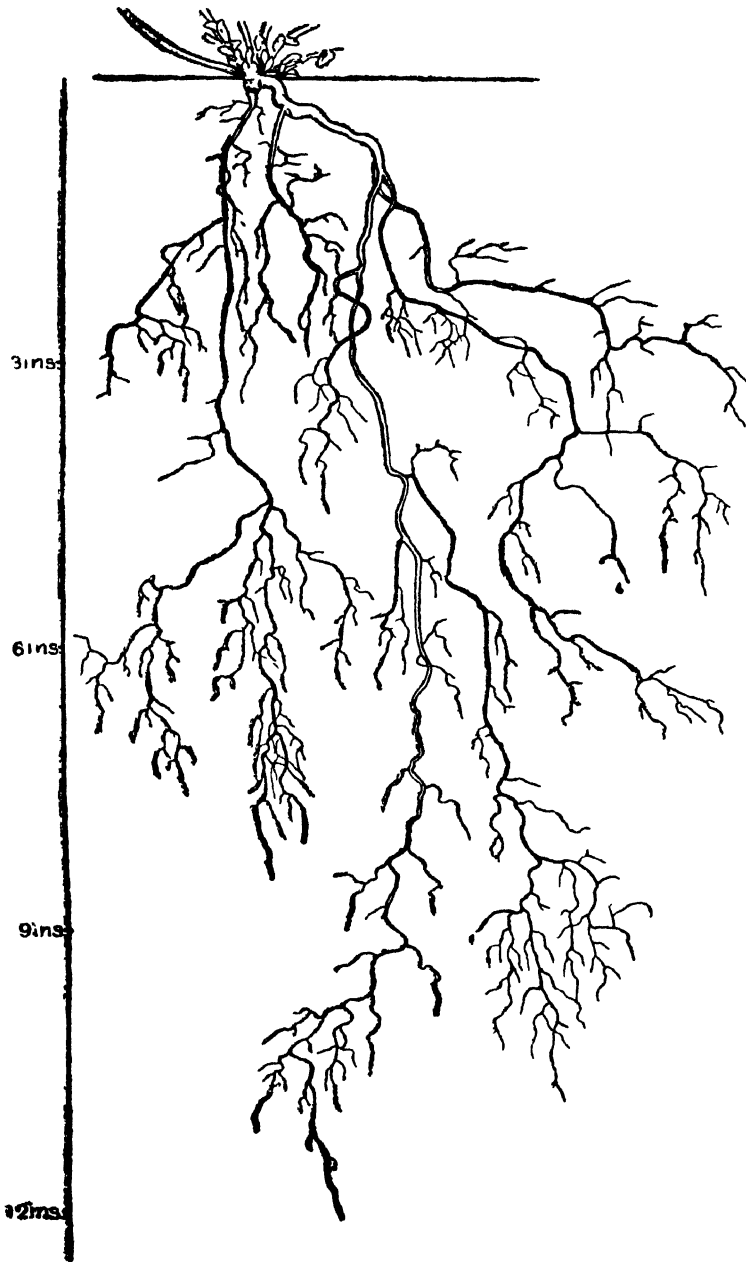


FIG. 1. — Root-system of *Galium verum* ($\frac{1}{8}$ natural size).

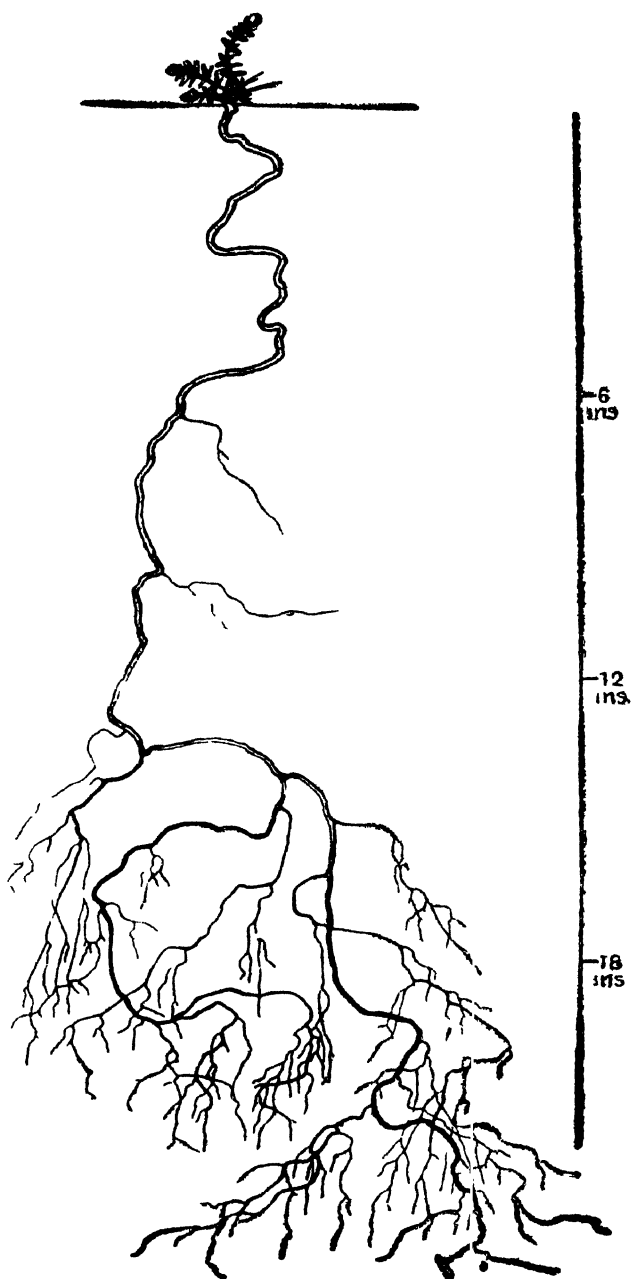


FIG. 2. — Root-system of *Hypericum hirsutum* ($\frac{1}{2}$ natural size).

<i>Ajuga chamaepitys</i>	20	<i>Asperula cynanchica</i>	265
<i>Ophrys apifera</i>	20	<i>Pastinaca sativa</i>	352
<i>Gentiana amarella</i>	21	<i>Lotus corniculatus</i>	475
<i>Linum catharticum</i>	31	<i>Poterium sanguisorba</i>	764
<i>Cephalanthera pallens</i>	58	<i>Scabiosa columbaria</i>	785
<i>Chlora perfoliata</i>	80	<i>Ononis spinosa</i>	796
<i>Carlina vulgaris</i>	98	<i>Onobrychis sativa</i>	1005
<i>Daucus carota</i>	100	<i>Verbascum thapsus</i>	1018
<i>Fragaria vesca</i>	135	<i>Thymis serpyllum</i>	1054
<i>Bromus erectus</i>	151	<i>Silene inflata</i>	1099
<i>Anthyllis vulneraria</i>	226	<i>Hypericum perforatum</i>	1277
<i>Hippocrepis comosa</i>	237	<i>Helianthemum chamaecistus</i>	1508

Investigations have also been made regarding the period of foliation, the distribution of stomates, etc.

Accelerating the Sprouting of Potato-tubers with Carbon-Bisulphide.

Van der GOOT, P Het vroegtydig doen spruiten van aardappelknollen met behulp van zwavelkoolstof. *Landbouw, Buitenzorg*, 1927, vol. 2, no. 6.

The length of the resting time, which potato-tubers require before they are able to sprout, is different in different varieties. In Java sprouting is an important problem to the farmer and it is only quickly sprouting varieties which allow of two crops being raised without difficulty in one year. This is the case with varieties, which, like the native variety "kolonjo", sprout within three months. Most varieties however do not sprout before 4 or 5 months.

During the investigation of fumigation control of the potato tuber moth Mr. van Heurn discovered by chance, that vapours of carbon-disulphide have a stimulating effect on the tubers and cause an earlier sprouting. For most varieties the best results were obtained with a dose of 40 cc. carbon-disulphide to the cubic metre for 24 hours, but some varieties sprout equally soon using 25 cc. of carbon-disulphide.

In some cases sprouting took place after 6 days and the tubers could be planted within one month after fumigation, but most varieties require 6 to 8 weeks after fumigation before planting can be done.

ANIMAL HUSBANDRY

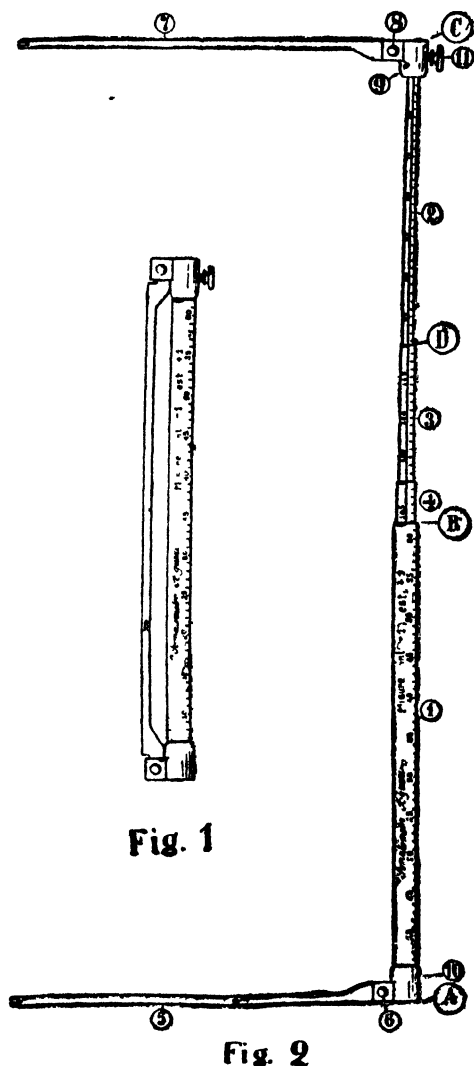


Fig. 1

Fig. 2

FIG. 1. — The Somatometer closed
 FIG. 2. — The Somatometer ready for use.

The Somatometer, a New Instrument for Measuring the Bodies of Animals.

AGUZZI A. Nuovo strumento per la misurazione del corpo degli animali. *La nuova Veterinaria*, Bologna, 1927, a. V, n° 5, p. 19-20, 2 fig.

In this article the writer gives two illustrations and describes an apparatus which he calls the "Somatometro". Unlike all similar instruments which are at present in use, this one makes it possible to take all the measurements of an animal's body, even the smallest, in height, length, and breadth (for the circumference, naturally, the use of a tape measure is indispensable); it is very exact, and can be used with facility and speed. In addition it is attractive in appearance, very practical, and is not cumbrous or heavy, only weighing about 2.15 kg. It is very strong and is rust proof, being made entirely of copper.

The writer explains by means of two illustrations the actual method of taking some of the more important measurements: height of

the body, distance of the trunk from the ground, length of the body, cross sections.

Blood Dry Matter in the Individual and Race.

KRONACHER C., BOETTGER, Th., OGRIZEK, A., and SCHAEFER, W. *Zeitschrift für Tierzüchtung und Züchtungsbiologie*, Berlin, 1927, Bd. VIII, Heft 2, S. 183, 227, 10 Tabellen, 6 Diagramme, 1 Abb.

Since the colouring matter of blood, which forms the chief constituent of its dry matter, has been pronounced by different writers to be an important item in estimating constitution and capacity in race and individual, the writers thought it advisable to test experimentally the possibility of using the dry matter content of the blood as an aid to judging constitution, since the previous statements on the matter were founded on insufficiently proved data and hypotheses.

Their experiments, the results of which are set out in numerous tables, were carried out partly on rabbits, partly on she-goats. A number of conclusions were reached of which a few are here given.

The dry matter content of the blood for each individual is subject to proportionately great and even daily fluctuations and depends partly on constant and what may be called constitutional influences, such as species, age, pregnancy, and lactation, and partly on temporary influences, such as surrounding temperature, atmospheric humidity, and intake of food and water, which are independent of the animal.

Milking seems in particular cases to have no real influence on the dry matter content of the blood, whereas between the latter and the fat percentage of the milk there seems to be a positive relationship.

A high positive correlation was found to exist between the dry matter content and the oxyhaemoglobin content of the blood and also certain differences in the average dry matter content were noted in 4 different species of rabbits. These results primarily shewed a certain even more definite connection between the amount of a certain part of the dry matter of the blood and pigment formation, inasmuch as Albino rabbits shewed the highest figure for dry matter in the blood, while the white Vienna rabbits with black eyes shewed the lowest.

In the light of these data and after very careful consideration the writers do not consider that the blood can by definite individual determinations provide a sure guide to the general constitution. They are however of opinion that it is not impossible that a race, whose individuals on the average are superior to those of another race in regard to the blood content in substances which are highly valuable for certain life functions, should be more resistant to definite influences and so, in a quite definite sense of part constitution ("teilkonstitutionell"), be valued more highly. But for the valuation of the constitution as a whole, one peculiarity in the condition of so unstable an organic structure as the blood will never be sufficient.

Nutritive Value of Pasture.

WOODMAN, H. E., Ph. D., Sc., BLUNT, D. L., M. A., and STEWART, J. M. A., B. Sc., *Journal of Agricultural Science*, Cambridge, 1927. Vol. XVII, Part 2, pp. 208-263, 24 tables, 2 charts, bibliography.

In 1925 experiments were made on the nutritive value of pasture grass on a light sandy soil under conditions resembling those of close and heavy grazing.

The present investigation was carried out in 1926 on an old established pasture on the University farm, Cambridge. This field had in previous years been grazed exclusively by a well-fed dairy herd. The area under examination was 1.4 acres. The old winter roughage was removed by harrowing, mowing, etc., during March and the grazing season investigated lasted from the end of March till the last week in October, during which period the whole area was cut short once a week with a grass mower.

Contrast of conditions in 1925 and 1926

In 1925 a light, sandy soil was used, in 1926 a stiff, gault clay.

In 1926 more copious and better distributed rain occurred, following an abnormally cold, wet spring.

Seasonal changes in botanical composition of the herbage

Surveys were made at 6 different dates. Noticeable was the falling off in such grasses as *Poa trivialis* and *Lolium perenne* and the increase in creeping bent (*Agrostis alba*, v. *stolonifera*). Despite the close cutting the growth of wild white clover (*Trifolium repens*) was not very luxuriant and it would seem that owing to their not dissimilar habits of spreading, creeping bent and wild white clover do not flourish well together in pastures.

Seasonal variations in yield and chemical composition.

No spring zenith of production was noticeable in 1926 as had been seen in 1925. In the presence of abundant rainfall, changes of productivity seemed to be primarily controlled by temperature, while in periods of comparative drought rainfall was the deciding factor.

The results very decisively confirm those of 1925 in respect of chemical composition. Irrespective of botanical composition or the presence of wild white clover, a pasture yields a herbage whose dry matter is exceedingly rich in crude protein, being twice as much as that in grass untouched till haying, and, further, under systematic close grazing, this high protein content is maintained throughout the whole season.

Seasonal changes in nutritive value.

Both experiments show that closely grazed pasture grass is a protein concentrate of high digestibility and nutritive value. It seems probable that only when herbage is allowed to grow long, as when poorly grazed, will the nutritive value be primarily influenced by botanical composition. When the diet of animals on closely cropped pasturage needs supplementing, carbohydrate concentrates should be given for all classes of stock.

In future the utilization of large areas of grassland for the sole production of protein concentrate is quite possible, the cut grass being either artificially dried and pressed, or simply ensiled. This home produced concentrate + roots and cereals will then form a proper winter ration for stock and largely obviate the necessity for importing expensive protein concentrates.

Seasonal variations in mineral composition.

The variations were not so wide in 1926 as in 1925 and at no time in the season was the pasture diet seriously unsuited, from the point of view of the lime-phosphate ratio, to the mineral requirements of adult animals.

The amounts of nitrogen, lime and phosphate removed from the soil under such a system are discussed, as is the utilization of the protein, lime and phosphate constituents by sheep in the digestion trials. The ability of closely grazed pasturage, when forming the sole constituent of the diet, to supply the requirements of dairy cows for lime and phosphate is demonstrated.

The Origin of Hippuric Acid eliminated in the Urine of Ruminants.

ROGOZINSKI P. and STARZEWSKA M. *Bulletin International de l'Académie polonaise des Sciences et des Lettres*, Cracow, 1926, n° 1-2 B., p. 157-175, 8 tables, bibliography.

After describing the results of previous research, the writers give details of their work, which included a series of tests carried out on a sheep, in which its food was varied from time to time and the influence exercised by these variations on the elimination of hippuric acid in the urine was determined.

The determination was made by the method which consists in treating the acidulated urine with acetic ester and estimating the nitrogen in the extract after washing in water.

The experiment includes 2 series of trials.

1st series : comprising 9 periods of a week in which on the one hand the influence of varying the protein content of the food on the elimination of hippuric acid was studied, and on the other the effects of consuming bulky fodders treated with cold dilute alkali.

2nd series : contained 9 periods of a week and was made in order to study the influence on the elimination of hippuric acid of giving the animal bulky fodders, straw or hay treated with hot water. It also included a study of the supposed connection between lignin and hippuric acid.

Details are also given with regard to the following points : the basal ration ; the varying additions made to this ration from time to time ; the amount of water consumed and excreta eliminated each day throughout the experiment ; the results of the estimation of total nitrogen in the urine ; the daily volume of urine ; the amount of nitrogen removed under the form of hippuric acid in 50 cc. of urine ; the amount of nitrogen removed daily in this form ; the amount of hippuric acid in the day's urine.

The following is a summary of the results of the writers' investigations :—

(1) Proteins play a quite secondary rôle in the production of hippuric acid in the ruminant.

(2) Lignin, contrary to popular theory, does not produce hippuric acid in animal metabolism.

(3) The substances which generate hippuric acid rank among the non-nitrogenous extractive substance of bulky fodders.

They are soluble in cold dilute alkali, and relatively less soluble in boiling water.

The Control of Cattle Tuberculosis.

I VON OSTERTAG (Stuttgart). II. KNAUER (Königsberg). Die freiwillige Bekämpfung der Rindertuberkulose. *Mitteilung der deutschen Landwirtschaftsgesellschaft*, Berlin, 1927, Jg. LXII, Stuck, 19, S. 507-510 und S. 510-512.

The most radical control method for cattle tuberculosis is the elimination of all beasts reacting to tuberculin, but it can only be carried out where the percentage of cattle so reacting is low. In European countries, with in many cases 70-80 % reacting, such a method is inapplicable. It is also unnecessary seeing that the tuberculin reacting cattle usually only refer to unimportant, local self-contained herds which are not affected in their capacity for breeding or utility and may even be considered as a protection against worse infections.

The tuberculin test is therefore not much used in Germany as a pointer to beasts which need elimination and there the OSTERTAG eradication process is increasingly employed, the object of this process being to seize upon those beasts which are noticeably likely to spread the disease and are obviously affected with tuberculosis and to eliminate them in order to confine the source of infection to the smallest possible number and to safeguard succeeding generations.

But the process takes so long, inasmuch as the inoculation trial must be used for the definite proof of tubercle bacilli, that at present this trial is not made and a so-called "accelerated elimination" is carried out wherever possible.

There can be no doubt that the best possible control measure against cattle tuberculosis lies in immunization against the disease. Prof. SELTER has lately succeeded in producing a "Vitaltuberculin", with which a persistent, possibly life long, immunization is said to have been produced in calves.

KNAUER summarizes as follows :—

(1) At the present time the OSTERTAG eradication process is the only one recognized for a proper control of cattle tuberculosis ;

(2) "Accelerated Elimination" in the absence of bacterial proof can definitely help in dealing to an increased extent with obvious tuberculosis, especially tuberculosis of the lungs, and in checking the spread of the disease ;

(3) The SELTER immunization process marks an important advance on the way to the prophylactic treatment of cattle tuberculosis. It makes possible the subcutaneous infection of calves with a serum of cattle tuberculosis bacilli of known virulence and number, thus producing a tuberculous process in the surrounding tissues which remains localized and induces a change in the body textures resulting in an effective defence against new infections.

If experiments on a large scale corroborate in practice the results so far achieved, it can be used as the complement of the OSTERTAG process.

First Attempts at anti-Foot-and-Mouth Disease Inoculation by means of Foot-and-Mouth Vaccine Complexes.

BEIJN M. *Comptes rendus des Séances de la Société de Biologie, Paris, 1927, t. XCVI, n° 14, p. 1116-1118.*

The writer gives an account of his notes on the effect of the inoculation of some 1000 cattle with foot-and-mouth vaccine complexes capable of producing foot-and-mouth lesions in guinea pigs. The virus used was a stable foot-and-mouth virus in different stages of virulence, can be made in large quantities and presents no difficulty in use.

He notes that inoculations made with these particular complexes have no effect on milk secretion, digestion or work capacity. Inoculations made in infected areas, and even in byres where sick animals are present, have shewn that no hypersensitive phase is produced, the disease taking exactly the same course in those animals which catch the disease at or just after inoculation as in those not inoculated.

The complex foot-and-mouth virus has never shewn any tendency to return to its former virulence.

Immunity is established slowly and progressively as from the 6th-8th day, individual variations are noticeable and immunity reaches its height about the 20th or 22nd day, sometimes later, while the action seems to be somewhat quicker in calves.

This state of immunity from natural infection can be sustained long enough for its existence to be proved in local epidemics.

To sum up, inoculation with foot-and-mouth complexes, which contain a suitably attenuated virus, involve no danger and, at the same time provide a definite immunity which is of practical service both in the byre and in infected areas.

This first inoculation prepares the way for inoculation with a complex containing a virulent foot-and-mouth virus, which, used as a second vaccine, can give a more marked and lasting immunity.

Live Stock Fluorose and Nitrous Gases.

CHRISTIANI H. La Fluorose du Bétail et les gaz nitreux. *Comptes rendus des Séances de la Société de Biologie, Paris, 1927, tome XCVI, n° 6, p. 388-389.*

In the course of previous experiments the writer managed to show that the aluminium factory disease was certainly a fluorose, having been able

to produce experimental fluoric cachexy not only by hays attacked by fluorine fumes and coming from land adjacent to such factories, but also by fodder exposed under bell-glasses to fluorine fumes exclusively, as well as by normal hays sprinkled with small quantities of soluble salts of fluorine.

He has now tried to discover whether nitrous fumes, which produce on plants burns analogous to those described as due to the caustic poisoning of acids and of fluorine salts, can help to facilitate or to aggravate the fluorose noted.

He has noted that hays, impregnated with fluorine from an aluminium factory, which had been given to animals under trial and had produced experimental fluorose, contained neither nitrites nor nitrates, at least in effective quantities, and cannot therefore be considered to have been attacked by the acids of nitrogen and capable of harming animals on that account. Cachexy of industrial origin appears after fodder attacked by the gases from aluminium factories has been eaten and is therefore a fluorose and can be produced without the presence of nitrous fumes.

Dual-purpose Cattle.

BUCHANAN SMITH, A. D., Animal Breeding Research Department, University of Edinburgh, *Scottish Journal of Agriculture*, Edinburgh, 1927, Vol. X, No. 2, p. 230-233

In the British Isles cattle are normally bred for beef or for milk production, their use as draught animals being most unusual, and the consumption of veal very small. The South American market is almost indifferent to milking qualities and, so pedigree exporters have of late tended more and more to develop the beef type.

A beef animal will normally be killed when about 14 months old. The Beef and the Dairy Shorthorn, the typical British types of beef and milk producing animals, have common ancestors and by the judicious use of beef bulls on essentially dairy stock excellent steers can be obtained for beef, while the heifer calves may be bred for milk, and after their 3rd or 4th calf will fatten far more readily than animals bred purely for milk, while their carcasses will fetch a better price. In countries where the aim is primarily either beef or milk the dual-purpose animal would appear the safest investment.

Influence of Feeding on Enzymes in Cows' Milk.

CHRZASZCZ, T. and GORALOWNA C. (Institut für landwirtschaftliche Technologie der Universität Poznań). *Biochemische Zeitschrift*, Berlin, 1927, Bd. 180, Nr. 4-6, S. 247-262, 11 Tabellen.

Amylase, Aldehydrase, Catalase and Peroxidase are considered by some investigators as fixed, by others as occasional milk constituents and

to be induced partly by bacterial action. In the last case their quantity in milk must fluctuate considerably and depend on the cow's food.

The writers set out to determine whether the food of the cow had any influence on the presence and amount of these enzymes in milk and whether a reciprocal quantitative connection might be established between the separate enzymes

Their experiments were made from 9 December 1925 to 10 July 1926, on the milk of 12 cows of the Golecin University farm. In winter the cows received per 1000 kg. live weight : 40 kg. roots, 5 kg. potatoes, 2 kg. cake, varying quantities up to 10 kg. of bran, or 9 kg. oat or barley straw, respectively, or hay ; in spring they received 15 kg. potatoes and 100 kg. green fodder. Also, for some weeks, only green fodder or only potatoes were fed.

Among other conclusions reached were the following :— The enzymes, diastase, aldehydrase, catalase, and peroxidase occurred in every normal milk. The first three appear in greater amount in the last milk of each milking and in the fat containing part. Peroxidase on the contrary is generally found most in the first milk. The irregular occurrence of peroxidase makes it appear to be a matter of chance. This phenomenon is not readily explained.

The kind of food exercises a comparatively small influence on the amount of enzymes. It has most effect on the amount of catalase.

A reciprocal quantitative connection was established only between diastase and catalase

The Influence of Sun or Artificial Ultra-Violet Ray Treatment of Cows on the Secretion of Anti-rachitic Milk.

VOELTZ, W., KIRSCH, A., and FALKENHEIM C., *Der Einfluss der Bestrahlung von Kühen mit künstlicher Höhensonne und mit Sonnenlicht auf die Sekretion von antirachitisch Wirkender Milch. Landwirtschaftliche Jahrbucher*, Berlin, 1927, Bd LXV, Heft 3, S. 375-397.

The question as to what factors produce milk of antirachitic properties or increase these properties, and whether this property of milk can be artificially induced or prevented, has for many years been studied by numerous investigators and has formed the object of more or less exhaustive enquiries.

Following the important discovery of HESS and STEENBOCK that radiation with the quartz mercury lamp confers the power of curing rickets on materials naturally without any effect on rickets, other investigators produced cow's milk with anti-rachitic properties and used the method for the cure of infantile rickets.

Further work in this field proved the influence of codliver oil feeding and of the sun's rays.

The writers preferred to use the measurable ultra-violet rays of a quartz lamp in the stable rather than the sun rays which are difficult to

gauge, whilst the possible influence of food was eliminated by giving during the experiment only food which was very poor in vitamins.

The experiment was carried out on 2 cows, of which one after being kept off vitamins for 3 weeks was treated twice daily, from 15 March to 20 June 1926, with the rays from a mercury lamp placed 75 cm. away from the animal's back, while the other remained untreated throughout and served as a control.

The milk of the treated cow shewed strong anti-rachitic properties when fed to rats. This antirachitic character was just as evident with this food low in vitamins as if normal winter food had been given, inasmuch as a normal winter ration may be practically devoid of vitamin D. The milk of the untreated animal had no antirachitic prophylactic effect, though, as a cure, a certain very weak anti-rachitic effect was noticeable, a phenomenon which remained unexplained.

The writers draw the following conclusions from the results of their work :—

Pasture milk differs from normal stall fed milk in its anti-rachitic properties. Normal winter feeding provides either very scanty anti-rachitic properties or none at all. The anti-rachitic effect of pasture milk could be attributed partly to the direct action on the cow of the sun's rays, partly to the content in vitamin D of the pasturage.

The writers consider that the use of artificial ultra-violet rays on the farm under given conditions is worth a trial.

The Influence of Ultra-Violet Light upon Calcium and Phosphorus Metabolism in Milking Cows.

HART, E B, STEENBOCK, H and SCOTT, H — *The Journal of Biological Chemistry*, Baltimore Md, Vol LXXIII, No. 1, pp. 59-68, bibliography

In 1924 it had been found that the exposure of lactating goats to 20 minutes ultra-violet light daily favourably influenced calcium assimilation. These data were in agreement with the observation of the healing of rickets in man, the rat and the chicken.

The present experiment was carried out by irradiation with a quartz mercury vapour lamp on 3 cows aged 8, 11 and 13.

The writers in their summary state that :—

1. Apparently ultra-violet light has little, if any, direct influence on the Ca and P metabolism of dairy cows.
2. It has no influence on the milk production of cows.
3. It has no apparent influence on the Ca and P content of the milk secreted.
4. Possibly the cow, unlike the man, the goat and the chicken, derives her anti-rachitic vitamin from her food.

5. These data do not indicate that the exposure of the dairy cow to sunlight is not beneficial.

Results of testicular Grafts on the Flocks of the Government General of Algeria.

VORONOFF S. *Rivista di Biologia*, Milan, 1927, Vol. IX, fasc. 1, p. 57.

In this article are given the results obtained in the flock of 3000 sheep belonging to the government of Algeria at the Tadmit Breeding Station by grafting on young animals, while in mid-growth, an extra testicle from an older animal, of greater maturity and with a richer internal secretion, with a view to increasing their yield in wool and meat. The grafts were made in 1924 and 2 years afterwards when the grafted rams had come to full maturity the following results were noticeable.

	Average weight of animals 2 years old —	Average weight of fleece —
Grafted rams	68.50 kg.	3.75 kg.
Non-grafted rams	61.30 »	3.10 »

Thus the increase in body weight is about $\frac{1}{8}$ and in the weight of the fleece about $\frac{1}{5}$. These results of operations on a very large number of animals taken in a flock show clearly the practical value of the method.

	Average Weight —	Weight of the fleece —
5 month lambs progeny of grafted sires . .	38.20 kg.	0.98 kg.
5 month lambs progeny of non-grafted sires .	30.10 »	0.68 »
Increase . . .	8.10 kg.	0.30 kg.

These results show that the creative energy produced in a young male by the addition of a third testicle allow the transmission by him as from the first generation, of his newly acquired qualities.

Obviously the grafting of all the existing rams in every country cannot be undertaken, but the results achieved give rise to the hope that it may be possible to create a race of rams with more and longer wool and with a greater live weight by fixing these qualities by successive grafting, so that the rams which have definitely acquired these characters may be able to transmit them to new generations. These rams, whose procreative

power is marvellous, would then be apportioned among the flocks of each country and would carry on the race artificially selected by grafting.

The Origin of the Caracal Sheep of Bokhara and the Derivation of the curly Fleece of their Lambs.

ADAMETZ L. *Zeitschrift für Tierzucht und Zuchtungsbiologie*, Berlin 1927, Bd VIII, Heft 1, S 1-64

Since the war the interest in sheep rearing for wool has greatly increased. A closer investigation of the origin of the important Caracal race of wool sheep is all the more important from the fact that, following the war and the subsequent confusion, not only has the number of sheep fallen considerably in their native Bokhara and China, but also the lamb fleeces there produced have greatly deteriorated in quality.

The writer in this work deals not only with the origins of this race on which opinions differ considerably even in zoological scientific literature, but also especially with the origin of the most important characteristics of this breed, namely the fat tail and the peculiar type of curling of the lambs' fleece

The writer came to the conclusion that this breed, whose wild original form according to zoological reckoning is *Ovis vignei*, probably variety *arkar*, was brought in the 8th century by wandering Arab tribes out of Mesopotamia into their new home of Bokhara and China and that the parts around Baghdad formed the focus of this wool sheep.

The forming of the fat tail of the Caracal sheep is not so much a modification of biological status as a mutation, which shows an adaptation phenomenon to the surroundings of the steppes. Viewed genetically this phenomenon is an instance of polymerism and depends on the simultaneous presence of several concordant genetic factors

The origin of the curliness is both biologically and genetically analogous to that of the fat tail. Syria, Palestine, Western Mesopotamia with the adjacent steppes may be regarded as the place of origin of these domestication mutations. While the fat tail may have arisen about 2000 years B C, the time of origin of the curliness is not quite certain, though excavation proves that as early as 1400 B. C., fleece of a Caracal type was used for trimming coats.

Contribution on Sheep Breeding in Saxony.

Beiträge zur Kenntnis der provinzialsächsischen Schafzucht. *Kuhn-Archiv.*, (Sonderband Tierzucht), Berlin, 1926, Bd. 13, 422 ss

After an introduction by the editor G. FROELICH, in which he discusses briefly the development of sheep breeding in this province, various

authors deal with the subject and describe the progress of breeding and the accomplishments of the most important pedigree flock and sheep farms in the province of Saxony.

Are Experiments on Pigeons suitable for determining Vitamine B in fresh and preserved green Fodder ?

SCHEUNERT A. and SCHIEBLICH, M., Ist der Taubenversuch zum Nachweis von Vitamin B, in frischem und konserviertem Grünfutter geeignet? *Zeitschrift für Tierzüchtung und Zuchtungsbiologie* Berlin, 1927, Bd. VIII, Heft 2, S. 315-320.

The writer were able to show by their investigations that experiments on pigeons with fresh green fodder do not produce any useful results, as the amount of food which can be given to a pigeon has too small a vitamin B content to allow the experiment to give any definite conclusion. The question whether satisfactory results can be obtained from experiments on pigeons with dried material still needs further careful investigations.

On the Existence of Egg-Laying Cycles in the Domestic Fowl.

HARLAND, S. C. (Imperial College of Tropical Agriculture, Trinidad), *Journal of Genetics*, London, 1927, Vol. 18, No 1, pp. 55-62 10. Tab.

The writer discusses the data afforded by experiments on the existence of definite egg-laying cycles in the domestic fowl.

The experiments were carried out at Trinidad in the presence of extraordinarily uniform environmental conditions, such as are not found in the north temperate zone, which give full play to the genetic factors involved. Trap-nest records are given for varying periods of a mixed lot of fowls of different sorts.

In his summary he states : —

1. There is a basal clutch number which is most commonly about 12, though in one experimental case it appeared to be 16.
2. A bird may lay a series of single clutches or multiples or sub-multiples of the basal clutch number.
3. When starting to lay a) for the first time, b) after brooding chicks, c) after moulting, some multiple of the basal clutch number is most usually laid. Multiples generally occur after a long rest period.
4. The clutch habit is absent in pure-bred poultry of American or European descent.
5. In certain cases the clutch habit behaves as a dominant, e. g.,

in these experiments in Native \times Leghorn or N. \times Minorca, or N. \times Plymouth Rock.

6. The time occupied by a clutch and the subsequent broody period is about a lunar month

The writer suggests as a reasonable speculation that the evolution of the domestic fowl, as regards the number of eggs laid per year, has taken place by a series of mutations resulting in the partial or complete elimination of rest periods between clutches or in the production of higher multiples of the single clutch.

AGRICULTURAL INDUSTRIES

The Value of Milk in Calories (1).

OVERMAN O R and SANMANN F P *Le Lait*, Lyons, 1927, n. 7, t VII, p. 149-161. 1 graph, 3 tables, bibliography

The knowledge of the value of milk in calories, *i. e.*, the number of calories produced by the complete combustion of a given quantity of milk, is both important and useful for the study of human and animal nutrition. The present investigation has been started in order to determine the heat of combustion of milks of different compositions, to compare the values thus determined with the corresponding figures obtained according to the composition of these milks, and to ascertain whether it is possible to establish by statistical methods simple formulae for determining the heat of combustion sufficiently accurate for practical use.

The samples represented the milks of dairy cows of Ayrshire, Guernsey, Holstein, and Jersey breeds, and of cows from the experimental herd of a Guernsey-Holstein cross, all belonging to the dairy section of the University of Illinois. The samples were taken at all stages in the periods of normal lactation, and from a mixture of all the milk produced by each cow during three days. The following points were determined for all the samples studied: specific weight, fat percentage; total protein, lactose, dry extract, and heat of combustion. The study of 212 samples of milk containing from 2.68 % to 7.50 % of fat has shown that the heat of combustion of 1 kg. of milk may be calculated by either of the following methods;—

(a) If only the percentage of fat is known, the formula $F = 115.3277 (A + 2.5064)$ should be used.

F = the number of calories determined per kg. of milk.

A = percentage of fat in the sample.

(b) If the percentages of fat, protein, and lactose are known, the formula $F = 93.39 A + 54.61 B + 30.60 C + 42.17$ should be used.

F = as above; A = as above; B = percentage of protein in the sample; C = percentage of lactose in the sample.

The true heat of combustion per gramme of butter fat, of milk protein and of milk sugar lies probably midway between the values given by

(1) When reference is made to calories the large calorie is always to be understood.

ABDERHALDEN and by HAMMARSTEN, and those given by FREDERICKSEN as found by ANDERSEN. At the same time, in a recent work, ANDERSEN gives the following formula for determining the heat of combustion of a kilogramme of milk :— $F = 300 + (113.5 \times \text{the percentage of fat})$, which gives results corresponding rather more precisely with those calculated according to the formula $F = 115.3277 (A + 2.5064)$ than do those based on ANDERSEN's formula as given by FREDERICKSEN.

Production of the Scent and Flavour of "Caramel" in Milk Products by *Streptococcus lactis* Lister.

SADLER W. *Le Lait*, Lyons 1927, t VII, n° 62, p 126-140, 5 fig., bibliography.

15,000 lbs. of butter made in a dairy in British Columbia were found to be unfit for sale by reason of a peculiar, unpleasant flavour.

Samples of fresh butter, butter which had been exposed for sale, and of the creams of various producers were examined. Part of the butter had an unmistakeable odour of caramel when it was delivered at the laboratory.

Some of the organisms which were producing the odour and flavour of caramel were isolated in pure culture from all the butter samples and from some of the cream samples

The organisms were found to be typical species of *Streptococcus lactis* Lister except for the fact that they produced the odour and flavour of caramel in milk. A more extended study was made of one culture, S. A. 30.

The intensity of both the odour and the flavour varies to a certain extent with the proportion of the contaminating product.

Butter made experimentally with infected cream has the typical odour and flavour, and an organism which had preserved its typical characteristics was isolated from this butter when 3 months old.

Cheese made from milk inoculated with the organism becomes too acid, shows other defects, does not ripen and is quite uneatable. The organism, preserving its specific properties, has been isolated from such a cheese four months after manufacture.

The organism must be regarded as a *Streptococcus lactis* Lister or, if the suggestion of HAMMER and CORDES be accepted, as a *Streptococcus lactis* Lister var. *multigenus*.

The aroma produced in the milk is slightly sweet, peculiarly resembling caramel.

In some cases the smell of malt is noticeable, in others a smell of burning or singeing; it may happen, though rarely, that the caramel scent is accompanied by a slightly putrid odour. The intensity of the smell has some connection with the percentage of contaminated product employed.

At the end of his work the writer observes that the culture S. A. 30 has lost the power of producing the taste and odour of caramel although an unpleasant taste and odour still lingered. This would suggest that the organism requires an occasional dormant period.

In any case the organism which produces this unpleasant taste and smell can be easily destroyed ; the milks and the creams must be classified according to their quality so that the presence of infection may be detected by the aroma.

As soon as any contamination has taken place, all dairy utensils should be thoroughly cleaned, and a thorough steaming will prevent the development of the infection. Once milk or cream has acquired the odour and flavour there is at present no means of eliminating them.

Simple Method of exact Determination of the Richness of Milks.

MATHIEU G. Méthode simple pour l'évaluation exacte de la richesse des laits *Le Lait*, Lyons, 1926, a 6, t VI, n° 52, p 153-155

The writer has looked for a method which, while giving proper accuracy, allows the determination of the value of the various milks yielded, while reducing to a minimum the number of fat determinations. The method advised by him, which is applicable both in the case of the milk of individual cows or in that of the mixed milk of herds, is as follows :—

After each milking or mixing of milks, as many tenths of cc. are taken as there are litres of milk. The sample is then poured into a flask and a piece of bichromate of potassium added to preserve it. The same process is carried out each day, always using the same flask for milk from the same source. The operation may be repeated for a week, a fortnight, or a month, and finally the flask holds a mixture of milks in the same proportions as that of the milks originally taken.

A single fat determination made on the mixture in the flask gives the average fat content of the milk, and this figure multiplied by the weight of the total milk will give the exact quantity of fat produced during the period, *i. e.*, it will allow a determination of the value of the milk.

The writer describes a trial made on the milk from 14 milkings at the Dairy School of Aurillac. Part of the milk was analysed after each milking and the average fat content was thus found to be 37.7 gm., while the determination of the fat content of the one mixed sample from the mixture of the 14 milks gave the average fat content as 37.5 gm., the difference between the two figures being thus almost negligible.

Unequal Acidity in the two Faces of a Cheese.

MESNIL, M. *Le Lait*, Lyons, 1927, a 7, t. VII, n° 62, p. 162-163.

The writer, having noted a very considerable difference in acidity between the two faces of a soft cheese, has investigated the influence of this unequal acidity on manufacture.

The different processes to which cheeses are submitted allow what is called the first salting face to remain longer than the other in direct contact with an atmosphere saturated in moisture and, so to speak, acidity, since this is the most intense period of lactic fermentation (acidity of milk, curd, and whey).

Analysis, moreover, fully confirms this observation. The unequal acidity has a very considerable effect on the development of *Penicillium*, for the growth of which an acid medium is definitely favourable. It is desirable in cheese-making to take pains so to adjust the development of the mould as to render its growth uniform on both faces of the cheese.

Cheese makers ought to pay great attention in the manufacturing process to returning the cheese into its press as soon as possible in order to hasten the elimination of the whey, and to heating the cheese-making room night and day to a constant temperature (20° C) in order to ensure a rapid and regular draining from both faces. In this way lactic fermentation will be equally intense and in consequence acidity will no longer show such large variations as are harmful to the ripening of cheeses. The development of *Penicillium* will be the same on both faces and ripening will take place normally in the cellar.

A Comparison of some Physical and Chemical Tests for determining the Quality of Gluten in Wheat and Flour.

COLEMAN, D A , DIXON, H B , and FELLOWS, H C , U S Dept of Agriculture *Journal of Agricultural Research*, Washington, 1927, vol 34, No 3, pp 241-263, 26 tab, bibliography

The baking methods for verification of the various gluten tests were as described in the U. S. Dept Agr. Bul 1187, being all made on straight grade flours.

As a result of their comparisons the authors come to the following conclusions .

A crude-protein determination either on the wheat or the milled flours is the best single-factor test of gluten quality.

Next comes the " washed-gluten " test, which gives excellent results in the hands of a single operator, but the results obtained are not easily reproducible.

Of the newer viscosity tests only the "single-concentration" test gave satisfaction. It would appear to be nearly as good as the dry-gluten or wet-gluten test and decidedly better than a determination of kernel texture or of the water-absorbing power of the flour.

These two last tests did not give very high coefficients of correlation and are apparently of about equal value.

As a measure of baking strength, the "four-point" system of GORTNER and SHARP, whence the "angle b" is calculated, proved of negative value. The same applies to tests of the viscosity of an even amount of protein or of the viscosity of an even percentage of protein.

The lack of closer agreement between the results of the newer gluten-quality tests and the volume of the baked loaf was no doubt due partly to variations in baking procedure.

The Destruction of Gossypol, a Toxic Factor in Cottonseed Products.

GALLUP, W D, *Industrial and Engineering Chemistry*, Washington, D C., 1927, Vol 19, No 6, pp 726-728

From time to time complaints of poisoning of cattle occur after feeding with cotton seed product.

The toxic element has been sought for by many investigators and SCHWARTZ and ALSBERG have definitely established a relationship between the toxicity of cotton seeds and their gossypol content.

The writer's experiments were directed to possible methods of eliminating this principles.

Cotton seeds were treated in 3 ways :— (1) kept moist and allowed to germinate, (2) soaked in water for 4 hours and autoclaved for varying periods under 20 lbs. steam pressure, (3) finely ground, spread in thin layers and put in an electric oven at 110° C. for varying periods.

It was found that heating, such as in the electric oven, readily changed the form of the gossypol without however affecting its toxic properties substantially. Heating in the presence of excess moisture, as in autoclaving, destroyed all forms of gossypol fairly quickly.

The growth of rats to which the products were then fed very closely corresponded with the changes produced in the gossypol, good growth being obtained only by rats fed on seed autoclaved for at least an hour with consequent nearly complete disappearance of all forms of gossypol. Those fed on untreated, or on germinated seed, or on seed heated in the electric oven up to 8 hours, simply died.

It follows that the time ordinarily necessary to remove all toxic elements from cotton seed by heat is much longer than that employed at the oil mill. Under ordinary conditions the gossypol is changed but not eliminated.

The Exportation of Sugar Preserved Eggs.

Farming in South Africa. Pretoria, 1926, Vol. I, No 4, p. 139.

Sugar preservation of liquid eggs is a new method of putting eggs on the market, which offers the advantages of economy in packing and transport and of preservation without the need for cold storage or of any antiseptic.

The eggs, which must be hen eggs, are broken under ordinary hygienic conditions. The yolk and white are mixed and 50 % of refined sugar added before closing in new tin boxes weighing 14 lbs. or 18 lbs. net. This product finds a ready sale on the British market for use in pastries and is sold at 9d. to 11d per lb

SYLVICULTURE

The Question of Diplomatic Representation for Forestry.

Skogsboukets Representationsfraga. *Skogen*, Stockholm, 1927, Year 14, No. 8, p. 195.

In the above-mentioned article the question is raised of the necessity for appointing Swedish official representatives for forestry, who during a certain number of years should study the problems relating to their science in foreign countries, for example in North America, Russia, Central Europe and in the Mediterranean countries.

These representatives should in the first place : (1) study and estimate the timber production of the country to which they are accredited, taking into account the quantity, kind, dimensions and the quality required ; (2) propose arrangements for production in their country based on the above-mentioned investigations ; (3) make proposals for the management of the forests based on experience obtained ; (4) facilitate co-operation between foreign and national institutions ; (5) make themselves acquainted with the forest policy and other important agricultural, social and sylvicultural questions of the country to which they are assigned.

Forestry Work and Difficulties in Bulgaria.

SAGAROFF DIMITRI. Die Aufgaben der Forstwirtschaft in Bulgarien. *Forstwirtschaftlicher Centralblatt*, Berlin, 1927, Jahrg. LXXI, Nr. 3, S. 89.

According to the latest statistics of 1908 to wooded area in Bulgaria is 2 834 393 ha. out of a total area of 9 634 550 ha., or 30 %.

In spite of the war and rectifications of boundaries the wooded area has not undergone modifications. After the war the following works were restarted : (1) delimitation of the zones destined for sylviculture and agriculture ; (2) rectification of the periphery of the forest area ; (3) organization of the management of the forests ; (4) correction of torrents and re-afforestation.

As regards delimitation it was first of all necessary to determine what should be regarded as forest areas and what as agricultural lands. A law

of 1922 defined an area of 103 000 ha. as forest land, which forms scarcely 4 % of the wooded area of Bulgaria. About 11 300 ha. of the area hitherto wooded were assigned to agriculture

After the war the work of correction of forest boundaries was resumed and up to date it has been possible to round off and survey about 115 000 ha. of public forests

As regards the organization of forest management, the law of 1922 alone has had any appreciable result. This law appealed to the initiative of private owners, and the State compelled all communes and all private owners to prepare schemes of management for all their woods within a period of 3 years. Up to the present time an area of 292 000 ha., or about 11% of the whole wooded area of Bulgaria has been brought under systematic management: there are 260 000 ha. of highforest and 350 000 ha of coppice. The volume of timber in the former case is about 30 581 000 cubic metres with an annual increment of 380 720 cubic metres. The annual fellings amount to 515 000 cubic metres and there is therefore considerable over-felling. This fact is all the more deplorable as there are definite plans of forest management for only 30 200 ha. while for 265 000 ha. only provisional plans exist.

Equally serious are the damage and malformations caused by cattle in the forests. The regenerated areas and the young forest have suffered most, and where formerly there were fine forests there is now only worthless scrub. Intelligent foresters in Bulgaria struggle against this calamity, but cooperation of the State, communes and private owners is desirable to obtain good results

The devastation of the forests is aggravated by the dangerous erosion of torrents.

The State has taken the matter up almost too late and has started work on regulating the watercourses but the necessary means are still lacking. The destruction of forests has caused an unfavourable change of climate. In Bulgaria, which has always suffered from continental west winds, there is intolerable heat in summer (even up to 40° C.). The writer, complains, as stated, of excessive felling, devastation of the forest by means of cattle and the defective control of torrents, but expresses the hope that in contracts to regulate the exploitation of the State forests reforestation may be considered and that occupiers may be compelled to devote the wooded areas to forestry.

Forestry in the State of Mysore.

KAMATENGAR B. V. Conservator of Forests. *Annual Report of Forest Administration in the Mysore State for the twelve months ending 30 June, 1925.* Bangalore, 1926, pp. 8-13.

As regards natural regeneration by seeds, taken as a whole the seeding of the principal species cannot be considered as quite satisfactory. The abnormal drought, which obliged the authorities to allow free grazing

and lopping for fodder in the Maidan, has in part contributed to this result.

In certain regions, however, teak (*Tectona grandis* L.), sandalwood (*Santalum album* L.), white cedar (*Dysoxylum malabaricum* Bedd.) and Nagasampigay (*Mesua ferrea* L.) have seeded well, but Kiralbogi (*Hopea parviflora* Bedd.) has not done as well as last year. Natural regeneration may, however, be considered to be fair all over, except in a few districts. In the deciduous forests Matti (*Terminalia tormentosa* W. and A.), Honne (*Pterocarpus Maruspium* Roxb.) and "Bete" did well; in the Semi-Evergreen forest, Jambe (*Xylia xylocarpa* Roxb.), Nandi (*Lagerstroemia lanceolata* Wall.), Hebhalasu (*Artocarpus hirsuta* Lam.), Gobgrainerlu (*Bischoffia javanica* Bl.) and "Kalgari"; and in the Maidan forest there was satisfactory regeneration of Kagli (*Acacia Catechu* Willd.), Naibela, Somay, Dindiga (*Anogeissus latifolia* Wall.), Ippe (*Bassia longifolia* L.) Bage, Bilvara (*Albizzia odoratissima* Benth.).

Reproduction by coppice has been generally satisfactory.

Hoeing and weeding was done round seedlings of the valuable species.

A total of 101 acres represents the extent added on to the regular plantations in the State. Of these, as many as 92 acres have been planted with teak and the rest with Matti and Eucalyptus.

Sissoo (*Dalbergia Sissoo* Roxb.) has done so well wherever it has been tried, that its introduction on a larger scale in the Maidan and Semi-Malud forests where fuel and small timber is the chief demand is worthy of consideration. The introduction of this tree into all the plantations in the Bangalore and Kolar Districts will probably solve the firewood problem of Bangalore.

With regard to other forms of artificial reproduction, the sowings and dibblings of selected species like Teak, Sandal, Bogi, Honne, Matti, Jalari (*Shorea Tallura* Roxb.), Bage, Nerlu (*Eugenia Jambdana* Lam.), Bilwara, Banni (*Quercus glauca* Thunb.), Chujjalu, Honge (*Pongamia glabra* Vent.) Hunse, Sissoo, Naibela, Seemethangadi, Seemehunse, Thangadi, were carried out as usual in the State forests as well as elsewhere.

Thinnings, clearings, weedings, cutting back and coppicing of deformed and unsound trees, girdling of inferior species interfering with the growth of more valuable ones, freeing of stems from climbers, etc. were carried out generally, as far as funds permitted.

The quantity of timber sold was much larger than in the previous year, the demand amounting to Rs. 8,80,490 as against Rs. 7,29,559 of the previous year.

The quantity of sandalwood collected and prepared has been nearly twice as much as in the previous year, and the net sum realised by the sale of sandalwood oil has been Rs. 17,47,758 as against Rs. 13,24,836 in the preceding year.

The sale of charcoal and firewood, of fodder grass, and of bamboo has been very much less than in the previous year, while the returns on minor forest produce, owing to the sale of barks at the end of 1925, amounted to a total of Rs. 10,53,893 as against Rs. 77,878 in the previous year.

Sylviculture in Federated Malay States.

G. E. S. CUBITT. Conservator of Forests F. M. S. & S. S. *Supplement to the F. M. S. Government Gazette, Federated Malay States. Report on Forest Administration for the year 1925*, pp. 9-11. Kuala Lumpur, 1926.

The outstanding feature was the profuse fruiting of "taban merah" (*Dichopsis Gutta* Benth.) early in the year in the Trolak and Rantau Panjang Reserves.

The seed-crop in the mangrove (*Rhizophora*) forests was much below the average.

In spite of a number of bad seed-years natural regeneration appears in all felling areas. It is seldom complete, but it is far more profuse than in virgin forest.

With regard to artificial reproduction in Perak State, forty acres in the Matang Reserve were planted with mangrove, and five acres were added to the "rotan" (*Calamus* and *Daemonorops* Oriff) plantation. The Para rubber plantation (*Hevea brasiliensis* Muell.) at Taiping was maintained.

In Selangor State 87 acres were added to the area of mangrove plantations, and on Klang Island 3,771 mangrove seedlings were planted out in sections of bamboo and are doing well. It is interesting to note that five-year old "yemane" (*Gmelina arborea* L.), a Burmese tree has already flowered and fruited. A suggestion has been made to plant "jelutong" for tapping (*Dyera Maingayi* Hook fil et *D costulata* Hook fil) and a few seeds have been sown and are developing well. The seed is very difficult to secure and has never before been collected in any quantity. There were no specimens in the herbarium.

No regular plantations are recorded for the other States, but it is reported that 521 "chengal" (*Balanocarpus maximus* King) and 87 "merbau" (*Azela palembanica* Bak). have been found in excellent condition in spite of the abandoned plantation since 1912.

At the end of the year the total area of regular plantations in charge of the department was 1,321 acres.

With regard to cultural operations, the writer says that in Perak State the 203 acres of line-planting of "rotan-sega" (*Calamus ornatus* Griff) in shade in the Pondok Tanjong Reserve were written off, the experiment being a failure, although it is strange that planting in the open should be more successful. In another Perak Forest, the Parit Reserve, three acres of broadcasting of "meranti" (*Shorea* sp) and two acres of sowing of "chengal" (*Balanocarpus maximus*) are now completely merged in new natural regeneration of the same species.

In the Rantau Panjang Reserve of the Selangor State, 31 ½ acres were planted with "taban" (*Dichopsis gutta*) twelve feet apart in lines cut through parts of the forest containing a poor stock of that species. Stump plants from nurseries were first utilized, and then natural seedlings.

In Negri Sembilan State, the only work done was the maintenance of the 39 acres of dibbled "taban", and the 86 acres of planted "damarlaut" (*Shorea utilis* King and *S. glauca* King) in two different Reserves.

In Pahang State the lines planted with "chengal" and "kulim"

(*Sodorocarpus Borneensis*) were located and cleared, and 1,421 "chengal" and 33 "kulim" were found spread over an area of about 65 acres. In the Pulau Lang Reserve about 7 1/2 acres of blanks were planted with mangrove.

In regard to operations of improvement or replacement of the growing stock, the writer says that in the Kurau Reserve of Perak State the ringing of "api-api" (*Lumnitzera coccinea*) in order to encourage development of the more valuable "berus" (*Garcinia* sp.) was continued over an area of 30 acres, and that improvement or regeneration fellings were made in all the regions over a large acreage. Opinion is now gaining ground that in inland mixed timber forest these unremunerative improvement fellings may in certain cases be superfluous, if a new crop can be secured by a system of remunerative regeneration fellings spread over a comparatively short period. In Selangor State cleanings after exploitation were carried out. In Negri Sembilan State the system of periodic improvement clearings was continued over an area of 577 acres.

In Pahang State improvement fellings were carried out over 974 acres, in favour of "taban merah"

Valuable Chilean flora.

MOMBERG, J. A. Riqueza de la flora chilena. *Boletín de la Sociedad Nacional de Agricultura*, Santiago, 1927, v. LX, nº 4, p. 187.

The writer after testifying to the utility of the recent institution of the "Dirección de Fomento Industrial" whose duty also will be to investigate the possible utilization of many species of indigenous forest plants, gives some account of the following plants -

"Zarzamora" (*Rubus ulmifolia*), which has hitherto been considered a weed in cultivated land, may on the contrary be usefully employed, since its bark, which is easily detachable from the wood, contains fibre suitable for cordage, sack-cloth, etc

"Huella" (*Abutilon vitifolium*) contains in its bark a strong, elastic fibre with a silky lustre. It grows wild in several mountainous regions, especially in the region of the lower reaches of the Bueno river

"Maqui" (*Aristotelia Maqui*) of the family of the Tiliaceae, has in Chili the same importance as jute in British India. The bark, suitably treated, yields a fibre for making sack-cloth

One hectare covered with this plant easily yield half a ton of fibre, that is to say enough to make 500 nitrate of soda bags. The wood is very suitable for making paper pulp.

The Ramification of Roots and its Importance in Forestry.

HILF, Dr. H. H. Die Wurzel ausbreitung und ihre waldbauliche Bedeutung. *Centralblatt für das Gesamte Forstwesen* Vienna, Leipzig, 1927, Jahrg. 53, Nr. 5-6, S. 162.

The writer has investigated separately the vertical and horizontal ramification of trees of spruce, Scots pine and beech, suitably selected.

The object of this investigation was to ascertain the part which the vertical roots take in the general construction of the radical system of the tree, this knowledge being of very great importance for the investigation of root competition. HILF has made experiments on the convergence of the roots of young pines in a nursery surrounded by mature pines and beech trees. These experiments have given the interesting result that danger of "red disease" and drought are increased by the competition of the roots of the old trees; the former danger is noticed on the north side of the trunks and the latter on the south side of them exposed to the sun.

According to the writer the competition of the roots is more important in pines because they grow in relatively dry places.

It should however be noted that all the experiments regarding radical extension relate to lands in Northern Germany, and that before any pronouncement on the possibility of arriving at general results it would be necessary to make similar experiments in places of growth of different kinds.

"Tlaia" (*Tamarix articulata* Vahl). (1).

TRABUT, I. Le Tlaia. *Bulletin agricole de l'Algérie-Tunisie-Maroc*, Algiers, 1927, n. 33, n^o 2.

This tree of the Tamarisk family, is found in Africa in Tafilalet, in the sandy valleys of Zousfana, in the country of the Tourags (where it is still called "Ethel") in Tripoli, in Fezzan, at Koufra, in Egypt, Arabia, Mesopotamia, Persia, Beluchistan and in India.

It has been introduced with excellent results in the desert of Colorado and in California, where it is considered a very good windbreak, 5 year old plants actually reaching a height of 15 m. with a diameter of 40 cm. at the base of the trunk.

It is a medium-sized tree, the small branches of which are covered after flowering with numerous galls called "*Takaout*" or "*Adba*" which result from punctures made on the flowers by an arachnid *Eriophyes* sp. These galls are rich in tannin and are consequently largely used by the Arabs for dressing fine skins.

The Tlaia likes a soil to be humid but not excessively so and it grows well and quickly in sandy soils and also on unfertile dunes, which it serves to fix and afforest forming an excellent windbreak.

It is easily grown from cuttings, planted at a good depth in spring or at the first rains.

Its uses can be summarized as follows:— it yields tanniferous galls, is an efficient means of dealing with sandhills and dunes, makes a splendid windbreak, and provides a timber which can be used in various ways, for burning and for the production of motor fuel (after the 4th year).

(1) Other names are: *Tamariscus* Ait. P. Alp.; *Thuya aphylla* L.; *Tamarix orientalis* Forsk.; closely allied species are *T. salina* of India, and certainly *T. usneoides* of South Africa.

Its wood is of a reddish-yellow colour, light but solid if well seasoned, with a density of 0.950 and like the bark rich in tannin. It makes good tables, poles and implement handles and is specially suitable for turning work, being used for making bowls, plates and dromedary saddles.

Each adult plant in the wild state gives about 20 kg. of galls.

Plants cut right down quickly send out fresh and vigorous shoots.

Apart from *Eryophies* sp. mentioned above, only one scale insect is known to live on Tlaia, namely *Aonidia Tlaia* Balachowsky.

Beach Forests near Koetoardjo (Java).

ZWART, W. Over de strandbosschen by Koetoardjo. (With a summary in English). *Tectona*, Buitenzorg, 1927, vol. 20, No. 1, pp. 54-61

The history is given of the forest of "njamploeng" trees (*Calophyllum inophyllum*) near Koetoardjo (Central Java).

The Analysis of the Forests in the Islands Poeloe Laoet and Seboekoe. (Borneo).

VAN DER LAAN E., De analyse der bosschen van de eilanden Poeloe Laoet en Seboekoe der Residentie Zuider- en Oosterafdeeling van Borneo. (With a summary in English). *Tectona*, Buitenzorg, 1927, vol. 20, no 1, pp. 19-36.

This paper is the continuation of other papers, in the review *Tectona* dealing with the forests in South-East Borneo. The author gives a description of the forests of the islands, Poeloe Laoet and Seboekoe, and a list of the vernacular names and the probable scientific names of the different species of forest trees.

The Age of the Teak Forests in the North-Eastern Part of the Residency Madioen (Java).

ALTONA, T. De ouderdom der djatibosschen in noordoost Madioen. (With a summary in English). *Tectona*, Buitenzorg, 1927, vol. 20, no 1, pp. 1-18.

From vestiges of old fortifications and other data it may be deduced that the forests of the north-eastern part of the residency Madioen are about 600 years old.

Teak Forest Management in Java.

BECK, H. J. L., Bedryfzregeling (Eenige aantekeningen betreffende 30 jaren definitieve bedryfzregeling in de djati-bosschen op Java). (With a summary in English). *Tectona*, Buitenzorg, 1927, vol. 20, no. 2, pp. 75-152.

Notes on 30 years of Teak Forest management in Java.

Regeneration and Cultivation of the Teak.

HART, H M J and NOLTEE A C, Verjonging en verpleging van de djati (With a summary in English). *Tectona*, Buitenzorg, 1927, Vol 20, No 2, pp 199-123

Historical account of the methods followed in the cultivation of teak in Java.

The Position of Java-Teak on the World Market.

WARTA, A J De positie van Java-djati op de wereldmarkt (With a summary in English) *Tectona*, Buitenzorg, 1927, vol 20, no 1, pp 37-53

The present position of Java teak on the world market is not considered by the author as satisfactory. The cause seems to be, that the export is directed almost entirely to three countries (Holland, Germany, Italy). As British India, Siam and French Indo-China probably have reached their maximum output suitable for export and the use of teak is increasing considerably, Java has a good opportunity to extend its export to other countries than the three mentioned.

PLANT PROTECTION

DISCOVERIES AND CURRENT EVENTS IN WORLD PHYTOPATHOLOGY

Belgium : First Notification of the Existence of " Wart Disease " of the Potato (1).

Two centres of " wart disease " of the potato (*Synchytrium endobioticum*) have just been discovered almost simultaneously, the one at Cour-lecles (Hainaut), the other at Stavelot (Province of Liège).

In these two places the disease is localised in certain groups of small workmen's gardens, the produce of which is consumed by the occupiers themselves and wherein potato growing is often repeated on the same plot.

The competent Services of the Ministry of Agriculture have immediately taken the necessary steps for dealing with the situation.

Ceylon : A newly-found Cause of Root Disease of Ceylon Plants (2).

The fungus in question is *Rhizoctonia bataticola* (Taub.) Butler, formerly known as *Sclerotium bataticola* Taub. It has been described as the cause of a rot of sweet potatoes in the United States of America, of root disease of herbaceous plants in India and Egypt, and of root disease of woody plants in Uganda. In Ceylon its list of hosts includes plants of economic importance, green manure, shade, ornamental, fruit and timber trees, and horticultural plants. The majority of the records are new for other parts as well as for Ceylon. The list of hosts is being extended; at the moment it is follows:— *Camillea theifera* (older plants and seedlings), *Theobroma cacao*, *Hevea brasiliensis*, *Cocos nucifera*, *Anona muricata*, *A. squamosa*, *Citrus medica* var. *acida*, *C. aurantium*, *Coffea robusta*, *Musa paradisiaca*, *Lycopersicum esculentum*, *Capsicum annuum*, *Phaseolus vulgaris*, *Garcinia mangostana*, *Albizia moluccana* (also seedlings), *Grevillea robusta*, *Acacia decurrens*, *A. elata*, *Erythrina* sp., *Tephrosia*

(1) Communication from the official correspondent to the Institute, M. Em. MARCHAL, Director of the State Phytopathological Station at Gembloux.

(2) Communication from the official correspondent to the Institute, Dr. W. SMALL, M. B. E., F. L. S., Mycologist, Department of Agriculture, Peradeniya, Ceylon.

candida, *Clitoria cajanifolia*, *Cupressus macrocarpa*, *Juniperus* sp. (seedlings only), *Ochroma lagopus*, *Tristania conferta*, *Amherstia nobilis* (young plants only), *Cupressus Lawsoniana* (seedlings only), *Cassia multijuga*, *Ariocarpus integrifolia* (young plants only), *Rosa* (hort.), *Hibiscus rosa-sinensis*, *Aralia filicifolia* (hort.), *Tibouchina* (*Lasiandra*) sp. and *Dahlia* (hort.).

In Ceylon *Rhizoctonia bataticola* occurs alone on and in the roots of its host plants in many instances and under conditions such that it must be regarded as a parasitic fungus. In other cases, it is accompanied by one or more of the fungi which have been regarded in the past as causes of root disease in the tropics, particularly of woody plants, namely, *Fomes* (*lignosus* and *lanuocensis*), *Poria*, *Rosellinia*, *Ustilina* and *Diplodia* (*Botryodiplodia*) *theobromae*, but the circumstances of its occurrence in such complicated cases point to the primary parasitism of the *Rhizoctonia* and to the secondary nature of the other fungi. Further investigation is in progress, and a pycnidial stage of the sclerotial *Rhizoctonia* has been found. Root infection experiments are also in hand. *Rhizoctonia bataticola* is suspected of being widely distributed in tropical and sub-tropical regions and of being of great economic importance.

'Iraq : Phytopathological Notes (1).

Rusts of wheat (*Puccinia* spp.). - Rust attacks seem generally to be of a milder character than frequently and their comparatively late appearance this year reduces the damage caused.

Locusts. - Following the very unusual Southerly invasion of Locusts (*Locustaurus maroccanus*) as far as Baghdat and on the Euphrates from Fellujah to the Syrian border, and in view of very extensive egg-laying having taken place in the Northern Lawas of Mosul, Arbil, Sulaimania and Kirkuk a comprehensive campaign was planned by the Department of Agriculture and about Rs. 800,000 was allocated for the purpose.

This campaign was based on the use of bran-molasses-sodium arsenite baits and operations commenced with the hatching of hoppers from 12 March onwards. Very successful results have been achieved in all districts and enormous areas of wheat and barley have been saved from destruction.

As in 1926, but unlike all other years for which records are available, hatchings took place in the same locality over a period as long as three weeks; in fact locusts in three or four different stages have been found on the same ground. The reason for this is not known. In the Kurdish mountain districts locusts were hatching even at the end of April, being here, presumably, controlled by temperature.

Ergaija ("Sun" pest): *Eurygaster integriceps*. - In 1924 and 1925 large flying swarms invaded the Northern territories of 'Iraq and caused very extensive damage to wheat and barley. In 1926 only one doubtful instance was reported, in the Sulaimania area and very

(-) Communication from Mr. F. H. JACKSON, for the Inspector-General of Agriculture, 'Iraq, official correspondent to the Institute.

slight damage was done. In 1927 up to the end of April the insect has never been reported though a special watch has been kept for it. The reason for its non-appearance is not known; it can only be conjectured that the insect has either found adequate supplies of cereal plants in another country or that some factor has caused great mortality among the hibernating bugs, which it is believed fly from the Iraq plains to the mountains of Persia and Turkey and there pass the winter.

Italy : Diseases of Lilac and of *Aster* sp. in Piedmont (1).

Lilacs (*Syringa vulgaris*) grown on a large scale by a Turin nurseryman have been attacked by a wasting disease marked by necrosis of the collet which is produced by a fungus of the family *Pezizaceae*, of which the systematic position and biology are at present being studied by the local Phytopathological Observatory.

A very virulent form of *Uvarium* disease is damaging *Aster* beds.

Rumania : Apple Powdery Mildew (2).

Apple Powdery Mildew, produced by *Podosphaera leucotricha* (Ell. and Ev.) Salm., is rather uncommon in our country. This year it appeared towards the end of May in several gardens of the Tecuci and Tutova districts (Moldavia), where it was noted by us between 6 and 10 June. The flower buds and the young leafy shoots are covered with a thick white network of a floury nature caused by the mycelium and its conidial apparatus. The trees attacked bear no fruit. The older leaves are not attacked by the fungus.

The development of the disease was helped by a cold, wet spring followed by a dry summer. Different varieties have different power of resistance. Thus the "Reintte du Canada" is very susceptible while native varieties such as "Domnești" and "Crețești" are practically unharmed by the disease.

VARIOUS QUESTIONS RELATING TO PLANT PROTECTION IN THE DIFFERENT COUNTRIES

Algeria : Flights of *Doclostaurus maroccanus* during the Month of June, 1927 (3).

I. On 3 June, at the following places, Ref El Assel, Oued El Guelta, Aïn Guéralta and Peralh Dahia of the mixed Commune of Annale (Department of Algiers, douar of Taguaidie).

(1) Communication from the "R. Osservatorio di Fitopatologia" of Turin, transmitted by the "R. Stazione di Patologia vegetale" of Rome, official correspondent to the Institute.

(2) Communication from the official correspondent to the Institute, Dr. Trajan SĂVULESCU, Professor at the "Școala Superioară de Agricultură" at Herestrau-Bucharest.

(3) Communication from the Governor General of Algeria to the President of the International Institute of Agriculture.

2. On 22 June, at the douar of M'Hamid, the plain of Oued El Abd, Aïn Zitony of the mixed Commune of Cacherou (Department of Oran).
3. On 27 June, at Le Moulin Coincon of the Commune of Uzès le Duc (Department of Oran).
4. On 30 June, at Kherabcha of the mixed Commune of Les Maadid (Department of Constantine).

Dominican Republic : Chief Insects Harmful to Crops (1)

Citrus Plants (*Citrus* spp.). — (1) *Chrysomphalus aonidum* (L.). This is the scale insect very common on the leaves ; during winter in some provinces (La Vega) it is badly attacked by the fungus *Aschersonia* sp. ; it is also controlled by different Hymenopterous parasites, the most important of which is *Aspidiotiphagus lounsburyi*.

(2) *Selenaspidus (Aspidiotus) articulatus* (Morg.), chiefly on the leaves ; in intensity of attack it follows the preceding species.

(3) *Chionaspis citri*, Comst.: considerable development on the fruits, branches and trunk.

(4) *Lepidosaphes pinnaciformis* (Bouché), on lemon plants in the province of San Pedro de Macoris.

(5) *Coccus viridis* ? (Green), sometimes harmful, when accompanied by "sooty mould".

(6) *Saissetia oleae* (Bern.), widespread but not of great importance.

(7) *Ceroplastes floridensis* ? Comst., little developed.

(8) From time to time the leaves are attacked by Coleoptera, chiefly by *Diaprepes spengleri*.

Avocado Pears (*Persea gratissima*). -- (1) *Pulvinaria piri-formis*, Ckll. ; (2) *Aspidiotus destructor*, Sign. These scale insects are found on the underside of the leaf, mainly along the nerves.

Cacao (*Theobroma Cacao*). — The scale insect *Pseudococcus virgatus* ? (Ckll.) threatens to become very harmful unless dealt with in time. It is protected by an ant which uses bits of lichen, of wood, and close to the base of the trunk grains of earth to form galleries along the trunk, forming a sort of roof, where the scale insect lives ; the latter prefers the fruit and its peduncle. This *Pseudococcus* attacks also the peduncle of the flower and the young b ds.

Another insect which only rarely and sporadically attacks cacao plants, is a Termite, *Calotermes* sp.

Sugar Cane (*Saccharum officinarum*) — The most harmful insect is *Diatraea saccharalis*, Fabr. The scale insect *Pseudococcus sacchari* (Ckll.), which lives chiefly near the nodes, protected by the leaf sheath is also widespread.

Coffee (*Coffea arabica*). — The leaves are damaged, sometimes seriously, by the larva of *Leucoptera coffeella*, Guenée.

(1) Communication from the official correspondent to the Institute, Dr. Giuseppe Russo, Entomologist of the "Estación Nacional Agronómica y Colegio de Agricultura", Moca.

The leaves and buds are also attacked by the scale insect *Pseudococcus viridis*? Green.

Cabbages (*Brassica* spp.). — The leaves are greatly spoilt by the caterpillar of *Plutella maculipennis*, Curtis. This is attacked by parasitic Hymenoptera which will be determined and studied.

Onions (*Allium Cepa*). — The insect most to be feared and one which unless checked will cause serious damage is *Thrips tabaci*, Lindemann. It develops in the most extraordinary way chiefly in dry seasons, as it finds rain a serious impediment.

Coconut (*Cocos nucifera*). — The most harmful insect is the scale *Aspidiotus destructor*, Signoret, which lives on the underside of the leaves and often kills them, so severe is its attack. To damage done by scale insects must be added the destructive action of the caterpillar of *Homaledra sabulella*, Chambers.

The two insects are polyphagous species and are therefore treated with difficulty or, rather, uneconomically by artificial control methods and consequently all possible methods of biological or natural control will be considered. Hence, if advantage may be taken of the work which is being developed by the International Institute of Agriculture, I should be grateful to any entomologists who would give me information especially as to possible parasites to introduce, seeing that *A. destructor* and *H. sabulella* are species exotic to the Dominican Republic.

Here *A. destructor* is attacked to a very slight extent (2-3 %) by the Hymenopteron *Aphelinus chrysomphali*, Mercet, while the predatory lady-birds (*Scymnus* spp.) do not touch it, chiefly attacking the dead bodies of scale insects.

Cotton (*Gossypium* sp.). — *Ictinophora gossypiella*, Saund. is a real pest and forms the chief impediment to the spread and increase of cotton growing in the country.

The bolls are also attacked by two Hemiptera, *Dysdercus andreae* and *Dysd. neglectus*.

Beans (*Phaseolus* spp.). — The Hemipteron *Empoasca mali*, Le Baron can assume pest proportions in the summer.

In winter, it is severely attacked by the fungus *Beauveria* (*Sporotrichum*) *globulifera*.

From time to time the leaves are attacked by certain beetles especially of the genus *Diaprepes*.

Guaava (*Psidium Guajava*). — (1) *Coccus viridis*? (Green) attacks the leaves and branches. (2) *Pulvinaria piriformis*, Ckll., attacked in its turn while in the egg stage by a small predatory lady-bird which is often fairly successful in countering the scale insect.

Papaw Tree (*Carica Papaya*). — The scale insect *Pseudoparlatoria* sp. attacks the stem, the petioles, or the leaf blades. It is not uncommon to see plants entirely covered with the little scales of the insect.

Specimens of *Aspidiotus destructor* are sometimes found on the underside of the leaf.

Maize (*Zea Mays*). — Maize is badly attacked by insects both in

the field and in the granaries, and a 50 % loss may be estimated as caused in this way.

(1) *Laphygma frugiperda*, S. and A. attacks buds and leaves.

(2) *Chloridea obsoleta*, Fabr. : Its larva lives mainly inside the cob apart from the direct damage done the galleries made by it in the cob encourage the advent of other insects.

(3) *Aphis* spp. attack chiefly the buds and often the whole plant.

(4) *Calandra oryzae*, L. attacks the cobs both in the field and in the granary.

(5) *Sitotroga cerealella* (Oliv.), harmful chiefly to cobs in the granary.

Egg Plant (*Solanum Melongena*). — (1) *Epitrix parvula*, Fabr. : this small beetle attacks the leaves and causes the same damage as to potato leaves, riddling them to the serious detriment of growth and crop.

(2) *E. cucumeris*, Harr. is found in company with the last species though in smaller numbers, while it attacks tobacco severely.

(3) *Corythaica monacha*, Stal. attacks the plant, often causing considerable damage, living on the underside of the leaves which suffer chlorosis and often die.

Mango (*Mangifera indica*). — The leaves are attacked chiefly by the scale insect *Vinsonia stellifera*, West.

Palms. — The leaves are attacked chiefly by the caterpillars of *Homaledra sabulella*, Chambers.

Potatoes (*Solanum tuberosum*). — (1) *Phthorimaca operculella*, Zell., is very widespread chiefly in the province of Monte Cristy.

(2) *Epitrix parvula*, Fabr., mentioned above.

Mexican Apple (*Casimiroa edulis*). — The insect which does most damage to this plant, attacking leaves and buds, is the scale insect *Coccus* sp. which is the indirect cause of damage by sooty mould, whose growth it favours.

Pine Apple (*Ananas sativus*). — The fruit is attacked, but hitherto not very seriously by the scale insect *Pseudococcus* sp.

Tomatoes (*Lycopersicum esculentum*). — The leaves are attacked by the caterpillar of *Protoparce sexta*, Joh.

Tobacco (*Nicotiana Tabacum*). — (1) *Prot. sexta*, Joh. : the caterpillar eats the leaves.

(2) *Epitrix cucumeris*, Harr. : among the various Solanaceae it prefers the potato ; the damage consists in the riddling of the leaf which often becomes like a sieve

(3) *E. parvula*, Fabr. : produces the same damage as the last, but is generally present in smaller numbers, preferring potatoes and the egg plant, in certain cases however the leaves are actually spoilt by the damage done.

Gourds (*Cucurbita* spp.). — The fruits, the petioles and the stems are often tunnelled by galleries made by the caterpillars of *Margaronia hyalinata* ? L. to the detriment of growth and crop.

The leaves often curl and become yellowish in consequence of *Aphis gossypii*, Glover, which lives on the underside of the leaf where it forms characteristic colonies.

Uruguay : Brief Note regarding *Icerya purchasi* and its Control by *Novius cardinalis* (1).

There are in this country at the present time a considerable number of scale insects parasitic on cultivated plants, which have been accidentally introduced into Uruguay with these plants at various times. It is indisputable that they have become well acclimatized to the temperate climate and have continued to increase throughout the country, sometimes in quite unexpected forms and in a very short time, with serious resulting damage to agriculture. Among these insects are found the well known *Icerya purchasi*, Mask., which has gradually spread to various kinds of plants, attacking citrus plantations as well as other trees on the farms on the outskirts of Montevideo, and thus becoming a serious menace to their existence.

There is reason for believing that *Icerya purchasi* were accidentally introduced into Uruguay in the year 1914, with some plants imported from Portugal, which were planted by their owner in a garden outside the capital. They were observed for the first time in 1915 and have increased and spread to such an extent since that date that there are no plantations of citrus, acacia, roses, etc., which are entirely free from this dangerous parasite.

The most energetic measures were taken by the late "Defensa Agrícola" to prevent the increase of this insect throughout the Republic, and a supply of its special enemy, *Novius cardinalis*, Muls., was obtained from Portugal, but the results were less satisfactory than was expected.

The Laboratory of Plant Pathology of Lisbon sent various consignments to Uruguay, but unfortunately the insects always arrived dead.

Hence at the beginning of 1919 the late "Comisión Central de Defensa Agrícola" on the initiative of the Director Robert SUNDBERG, Ing. Agr., arranged to send an expert to France, and the same year Nicolás CORREA LUNA, Ing. Agr., properly went to that country and brought back a quantity of these insects, only a few of which lived owing, no doubt, to the length of the voyage. These few specimens, being kept in special cages and properly fed, speedily multiplied, the season also being favorable, and thus, in a few months it was possible to release the first groups, so that by degrees they might increase in the principal centres of *Icerya*.

In a very short time beneficial results were noted and it might be said, without fear of exaggeration, that within a year, more or less, of the introduction of *Novius cardinalis*, the *Icerya* was practically exterminated, and ceased to exist as a serious pest.

It should be recognized that it is due to *Novius cardinalis* and its potent destructive action that Uruguay has been able to preserve its important citrus plantations and at no great cost.

During the summer months small isolated groups of *Icerya* appear and spread over plantations, but they soon disappear under the influence of this great friend of agriculture.

(1) Communication from the official correspondent to the Institute, Sr. Agustín TRUJILLO PELUFFO, Ingeniero Agrónomo Regional, Sección Fomento y Defensa Agrícola de la Dirección de Agronomía, Montevideo.

Some time after the acclimatization of the *Novius cardinalis* in Uruguay consignments of this insect were sent thence by request to various countries.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

England (1). — The Minister of Agriculture and Fisheries in virtue of the Destructive Insects and Pests Acts, 1877 and 1907, has issued an Order, which came into force on 30 April 1927, prohibiting the entry into England and Wales of any raw cherries shipped from any port in European France unless accompanied either by a special certificate issued by a duly authorized official of the French Services d'Inspection Phytopathologique in the case of cherries grown in France, or otherwise by a certificate of origin in respect of each consignment visé by a Local Authority in the country of origin.

The Importation of Raw Cherries Order of 1926 is hereby revoked. (*Statutory Rules and Orders, 1927, No. 349. Destructive Insect and Pest, England. The Importation of Raw Cherries Order of 1927. Dated April 22, 1927. [D. I. P. 546]. London, 1927, 3 p.*)

* * The Minister of Agriculture and Fisheries, in virtue of the Destructive Insects and Pests Acts, 1877 and 1907, has issued an Order, which came into force on 25 April 1927, prohibiting in England and Wales the sale or exposure for sale of any plant or part of plant which is attacked by any of the following insects or pests :— Fruit Tree Cankers (caused by any parasitic fungi), American Gooseberry Mildew (*Sphaerotheca mors-uvae*, Berk.), Silver Leaf (*Stereum purpureum*, Pers.), Black Currant Mite (*Eriophyes ribis*, Nal.), Woolly Aphis (*Eriosoma lanigerum*, Hausm.), all Scale Insects (*Coccidae*), Brown Tail Moth (*Nygmia phaeorrhoea*, Dan. = *Euprocitis chrysorrhoea*, Linn.), Rhododendron Bug (*Leptobyrsa [Stephanitis] rhododendri*, Horv.), Powdery or Corky Scab of Potatoes (*Spongospora subterranea* [Wallr.] Johnson), Apple Capsid (*Plesiocoris rugicollis*, Fall.).

The sale of plants, etc., attacked by Wart Disease (*Synchytrium endobioticum* [Schilb.] Perc.) or Onion and Leek Smut (*Urocystis cepulae*, Frost.) is dealt with under the following Orders respectively : Wart Disease of Potatoes Order of 1923, Onion Smut Order of 1921.

The American Gooseberry Mildew Order of 1919 and the Sale of Diseased Plants Order of 1922 are hereby revoked. (*Statutory Rules and*

(1) The countries are arranged in the French alphabetical order.

Orders, 1927, No. 350. Destructive Insect and Pest, England. The Sale of Diseased Plants Order of 1927. Dated April 22, 1927. [D. I. P. 545]. London, 1927, 4 p.).

** For the purpose of preventing the introduction of the Potato Moth (*Phthorimaea operculella*, Zell.), the Minister of Agriculture and Fisheries has issued an Order under the Destructive Insects and Pests Acts, 1877 and 1907, which came into force on 2 May 1927, prohibiting the landing in England and Wales of any potatoes grown in the Canary Islands, unless accompanied by a certificate of health prescribed in the Destructive Insects and Pests Order of 1922. (*Statutory Rules and Orders, 1927, No. 377. Destructive Insect and Pest, England. The Importation of Potatoes (Canary Islands) Order of 1927. Dated May 2, 1927 [D. I. P. No. 547], London, 1927, 1 p.).*

Canada. — By a Decree of the Governor General in council, dated 20 April, 1927, No. 717, the following Regulations, the text of which is given in this Decree, have been revised :

(1) Regulation No. 3 (Foreign), 3rd Revision, prohibiting the importation of potatoes from Europe, the Azores Islands, the Canary Islands, Newfoundland, the Islands of St. Pierre and Miquelon, and the State of California ; shipments of potatoes from the States of Pennsylvania, West Virginia and Maryland shall be accompanied by a certificate stating that such potatoes were grown outside any area quarantined for wart disease (*Synchytrium endobioticum*).

(2) Regulation No. 4 (Foreign), 1st Revision, prohibiting the importation of all non-canned fruits or vegetables from the Hawaiian Islands, except the fruits of pineapple, banana and coconut, provided they have been inspected and certified free from infestation by the Mediterranean fruit fly [*Ceratitis capitata*].

(3) Regulation No. 8 (Foreign), 2nd Revision, prohibiting the importation of rooted plants, grafts or cuttings of currants and gooseberries (*Ribes* and *Grossularia*) from all countries with the exception of standard commercial varieties of gooseberries and red or white currants cultivated for their edible fruits only, as well as the fruits of currants or gooseberries, the importation of which is not restricted.

(4) Regulation No. 10 (Foreign), 4th Revision, prohibits importation of the following plants or plant products :—

(a) Corn and broom corn, including all parts of the plant, all sorghums and Sudan grass from the following States of the United States of America : Connecticut, Indiana, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont and West Virginia ;

(b) During the period June 1 to December 31, cut flowers and entire plants of chrysanthemum, aster, cosmos, zinnia, hollyhock, and cut flowers or entire plants of gladiolus and dahlia except the corms and roots thereor without stems, oat and rye straw as such or when used for packing celery, green beans in the pod, beets with tops, and rhubarb, from the

States of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont.

Broom corn for manufacturing, clean shelled corn either for seed or feed purposes, and clean seed of broom corn, may be imported provided such shipments are accompanied by a certificate of inspection, issued by an authorized officer of the United States Department of Agriculture, which states that the shipment is free from infestation by the European corn borer [*Pyrausta nubilalis*].

(5) Regulation No. 11 (Foreign), 2nd Revision, prohibiting the importation of alfalfa (lucerne) hay, whether for feeding, packing or other purposes, originating in the following States of the United States of America: California, Colorado, Idaho, Nevada, Oregon, Utah and Wyoming.

All shipments of alfalfa (lucerne) hay consigned to the provinces of Manitoba, Saskatchewan, Alberta and British Columbia shall be accompanied by a certificate, duly signed by the consignor, indicating the State in which the alfalfa (lucerne) hay was grown.

(6) Regulation No. 14 (Foreign), 2nd Revision, prohibiting the importation of all fresh peaches and peach nursery stock from the States of Wisconsin, Illinois, Missouri, Tennessee and Mississippi and the area east of these States, and from all other States of the United States of America unless the shipment of fresh peaches or peach nursery stock is accompanied by a statement duly signed by the consignor indicating the name of the State in which the peaches were grown; furthermore, the importation into British Columbia of all peach fruit pits or seeds for propagating purposes is prohibited from the States of Wisconsin, Illinois, Missouri, Tennessee and Mississippi and the area east of these States.

(7) Regulation No. 2 (Domestic), 6th Revision, restricting the movement of corn and corn products from certain areas in the provinces of Ontario and Quebec on account of the European corn borer [*Pyrausta nubilalis*].

Provision is made for the movement of the products under quarantine when complying with any one of the conditions laid down in this regulation.

(8) Regulation No. 3 (Domestic), 1st Revision, prohibiting the importation into the provinces of Alberta and British Columbia of all five-leaved species of the genus *Pinus* and their horticultural varieties from the other provinces of Canada.

(9) Regulation No. 8 (Domestic), restricting the sale on and after 1 June, 1927 of all species and varieties of black currants in Canada. (*The Canada Gazette*, Ottawa, May 14, 1927, vol. LX, no. 46, pp. 3464-3465).

Eritrea. — A Decree of the Governor dated 14 May, 1927, No. 4434, forbids the introduction into and transit in the Colony of banana plants and bananas coming from abroad. (*Bullettino ufficiale della Colonia Eritrea*, Asmara, 31 maggio 1927, anno XXXIV, n. 10, pp. 117-118).

Italy. — Royal Decree-Law, No. 1071, of 16 June, 1927, lays down that among the duties of the provincial Economic Councils ("Consigli

provinciali dell'Economia") — set up in accordance with Law No 731 of 18 April, 1926 — is that of reporting on the police regulations concerning, among other things, the control of crop enemies (*Gazzetta ufficiale del Regno d'Italia*, Roma, 7 luglio 1927, anno 68º, n 155, p 2866)

* * By Law No 1118 of 16 June, 1927, the Royal Decree-Law No 854 of 20 May, 1926, containing exceptional regulations for catching sparrows for the protection of wheat crops, has been converted into a Law (*Gazzetta ufficiale del Regno d'Italia*, Roma, 11 luglio 1927, anno 68º, n 158 p 2912)

* * Following the presence of grape phylloxera [*Phylloxera vastatrix*] which has been determined in the Commune of Sommariva Perno, in the Province of Cuneo, a Decree dated 30 June, 1927 has extended to the above Commune the rules contained in arts 10-14 of Regulation No 1099 of 13 June, 1918, relating to the exportation of such materials as are indicated in nos 1, 2, 3 and 4 of art 10 of the same Regulation (*Gazzetta ufficiale del Regno d'Italia*, Roma, 6 luglio 1927, anno 68º, n 154, 1 2864)

Luxemburg (Grand Duchy of). By Decree of 2 July, 1927, the importation into the Grand Duchy of cherries coming from France is authorized only when the consignments are accompanied by a certificate issued by the Phytopathological Service of the country of origin attesting (a) that these goods come from a district exempt from the cherry fruit fly (*Rhagoletis cerasi*) and (b) that the consignments themselves have been found free from *Rhagoletis* by this Service.

Importation will only be allowed through the railway custom-houses and through the custom-houses of Scheuegen, Dudelange, Finsange, Mondorf, Esch-sur-Alz. and Rodange.

Consignments not accompanied by the certificate prescribed above will be rejected unless they are found on examination by the Luxembourg Phytopathological Service to be free from *Rhag cerasi*. Such examination will be made at the expense of the importers.

Every producer or warehouse of cherries who notes the presence of *Rhag cerasi* in his crop or storehouse must immediately declare the fact to the Mayor of the Commune, who will inform the Phytopathological Service by telegram (*Mémorial du Grand Duché de Luxembourg*, Luxembourg, 9 juillet 1927, n° 36, p 509-510).

RECENT BIBLIOGRAPHY

Aamodt, O S Breeding wheat for resistance to physiologic forms of stem rust *Journal of the American Society of Agronomy*, Geneva, N Y, 1927, vol. 19, no 3, pp 206-218

[*Puccinia graminis Tritici* (Per.) Erikss et Henn]

Albach-Alsfeld, WALTER Thylloide Durchwachsungen von Epidermen *Zeitschrift für Pflanzenkrankheiten u Pflanzenschutz*, Stuttgart, 1927, XXXVII Bd, Heft 5/6, S 159-163, Abb 1-3

Atienza, MAXIMINO *Sclerotium* disease of tomato and pepper *Philippine Agriculturist*, Los Baños, Laguna, 1927, vol XV, no 10, pp 579-588, fig 1, pl I-II

[*Sclerotium Rolfsii*, Sacc]

Balachowsky, A Les insectes nuisibles au figuier en Algérie et leurs traitements *Revue Agricole de l'Afrique du Nord*, Alger, 1927, 25^e année, n° 392, p 69-75, fig 1-7

[*Mytilaspis pomorum*, L. *M. conchyiformis* Guérin, *M. minima*, Newst *Morganella longispina*, Morg, *Ceroplastes rusci* L. (parasited by *Scutellista cyanea*, Motsch and *Erastria scitula* Rbr) *Hypoborus ficus* Fv]

Ballou, F H and Lewis, I P Dilute versus standard sprays for apple blotch *American Fruit Grower Magazine*, Chicago, Ill., 1927, vol XLVII, no 2, pp 4, 18, 43, 1 fig

[*Phyllosticta solitaria* E. et R]

Barnes, H F New damage to peas by the pea midge *The Journal of the Ministry of Agriculture*, London, 1927, vol XXXIV, no 2, pp 159-164, 1 pl.

[According to observations made in England, *Contarinia pisi*, Winn, besides attacking the pods, attacks also the flowers and terminal shoots of peas]

Bathellier, J Sur les dommages causés par deux espèces de *Coptotermes* indochinois *Revue de Botanique Appliquée et d'Agronomie Coloniale*, Paris, 1927, 7^e année, Bulletin n° 67, p 170-172

[*Coptotermes travians*, Haviland, *Copt gestroyi*, Haviland]

Becker, JOSEPH A 'Progres a el picudo' *Boletín de la Compañía Administradora del Guano*, Lima, Peru, 1927, vol III, no 2, págs 63-67, 2 diagr

[*Anthonomus grandis*]

Benigni, EMMA Note sull' *Ustilago Maydis* (D C) Corda nella Valle Padana *Rivista di Patologia Vegetale*, Pavia, 1927, anno XVII, nn 3-4, pp 57-72

Berkeley, G H Studies in tomato streak *Scientific Agriculture*, Ottawa, Ont., 1927, vol VII, no 7, pp 210-223, 8 figs

[Disease the origin of which has not yet been definitely ascertained]

Binswanger, E Beizmethoden und Beizmittel *Schweizerische Obst- und Gartenbau-Zeitung*, Munsingen, 1927, 29 Jahrg -40 Jahrg, Nr 7, S 119-120

Bodnár, J. Villányi, IRÉNE and Terényi, ALEXANDER Biochemie der Brandkrankheiten der Getreidearten. I Mitteilung Die Kupferadsorption der Weizensteinbrandsporen (*Tilletia Tritici* [Bjerk]) aus Kupferverbindungen *Hoppe-Seyler's Zeitschrift für physiologische Chemie*, Berlin und Leipzig, 1927, Bd 163, 1, 2 u 3 Heft, S 73-93

Bongini, V Ancora sul « *Brachycerus algitus* » I. *Curiamo le Piante e la Difesa delle Piante contro le Malattie ed i Parassiti*, Alba, 1927, anno IV e XXII, n 3, pp 54-56

[Very injurious in 1926 to garlic crops in some zones in Tuscany, Italy]

Boyer, C. A. Diseases of raspberries and their control *American Fruit Grower Magazine*, Chicago, Ill., 1927, vol. XLVII, no. 2, pp. 7, 28, 2 figs.

[« Leaf curl », « streak », « anthracnose », « cane blight », « orange rust », « spur blight », « blue », « stem crown gall »]

Brandenburg, E. Die Mosaikkrankheit (Gelbfleckigkeit) des Spinats und ihre Uebertragung durch Insekten *Zeitschrift für Pflanzenkrankheiten u. Pflanzenschutz*, Stuttgart, 1927, XXXVII Bd, Heft 5/6, S. 173-182

Braun, ANNETTE F. A new species of *Holcocera* predaceous on mealybugs (Micro-lepidoptera). *Entomological News*, Philadelphia, Pa., 1927, vol. XXXVIII, no. 4, p. 118

[*Holcocera phenacocis* n. sp. on *Phenacoccus cornu* Ehrhorn, in California].

Cadoret, ARTHUR. Contribution à l'étude des traitements contre le mildiou. Détermination des époques d'attaques du champignon *Le Progrès Agricole et Viticole*, Montpellier, 1927, 48^e année, n° 15, p. 362-365.
[*Plasmopara viticola*]

Caesar, L. The Spray Service in Ontario *The Canadian Horticulturist*, Peterboro, Ont., 1927, vol. L, no. 2, p. 29. 1 fig.

Chardón, CARLOS E. and Toro, RAFAEL A. Plant disease notes from the Central Andes *Phytopathology*, Lancaster, Pa., 1927, vol. 17, no. 3, pp. 147-153, fig. 1

[Gummosis of the sugarcane. Il. 1. (1. root disease not well defined) *Omphalia lucida* Mühl. and Rang. (*Spinothrum lucida* Lef.) and Mühl. on coffee mosaic of tobacco) sugarcane mosaic *Uromyces appendiculatus* on *Phaseolus* spp. *Kuchnia* Lef. on the *Malanconium* *Sacchari* Mühl. *Leptosphacra* *Sacchari* var. *Brucki* de Hauss. on sugarcane *Sphaeroma* Jenkins on *Coffea* *Laetum* *Pistalis* on *Palmarius* Cooke on coconut *Septoria* *Lycopersae* Spec. on avocado]

Compton, C. C. and Flint, W. P. A suggestion for controlling the locust borer, *Cyllene robiniae* *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol. 20, no. 2, pp. 295-298

Costa, T. Osservazioni sul variare del numero di gli elementi fogliari nella barbabietola da zucchero (I Contributo) *Nuovo Giornale Botanico*

Italiano (Nuova Serie), Firenze-Forlì, 1927, vol. XXXIV, n. 1, pp. 134-142, figg. 1-2

[In connection with Bordeaux mixture sprays against *Cercospora beticola* (Sacc.)]

Costa, T. L'aureola di antorcinina nelle « tacche » della *Cercospora beticola* (Sacc.). *Nuovo Giornale Botanico Italiano* (Nuova Serie) Firenze-Forlì, 1927, vol. XXXIV n. 1, pp. 168-170

Davey, H. W. The currant moth (*Prothium tipuliformis*, Clerck) *The Journal of the Department of Agriculture of Victoria, Australia*, Melbourne, 1927, vol. XXV, part 1, pp. 39-40.

Day, L. H. Winter precautions against pear blight *American Fruit Grower Magazine*, Chicago, Ill., 1927, vol. XLII, no. 2, pp. 9-43

[*Bacillus amylovorus* (Burr.) Frev.]

Degrully, L. Le traitement du mildiou et la formule Villedieu *Le Progrès Agricole et Viticole*, Montpellier, 1927, 48^e année, n° 17, p. 405-408.

[*Plasmopara viticola*]

De Marzi, G. Sul dilagare della cuscuta *Il Gazzettino Agricolo*, Padova, 1927, anno V, n. 17, p. 1

Diffloth, P. Le ver du chou commun *La Vie Agricole et Rurale*, Paris, 1927, 16^e année, t. XXX, n° 7, p. 99-102, fig. 1-9

[*Pieris rapae*]

Doane, R. W. The genus *Ips* on the Stanford Campus *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol. 20, no. 2, pp. 284-286

Drain, BROOKS D. Spraying schedule for New England *American Fruit Grower Magazine*, Chicago, Ill., 1927, vol. XLVII, no. 2, p. 12

Dutton, W. C. Spraying and dusting schedules for Michigan *American Fruit Grower Magazine*, Chicago, Ill., 1927, vol. XLVII, no. 2, pp. 11-12

Edler. Brauchen wir ein Pflanzenschutzgesetz? *Landwirtschaftliches Jahrbuch für Bayern*, München, 1927, 17. Jahrg., Nr. 1-2, S. 75-93

Ekblaw, K J T Selection and use of portable sprays outfits *American Fruit Grower Magazine*, Chicago, Ill., 1927, vol XLVII, no 2, pp 424-25

Englisch, Otto Die Hopfendüngung unter Berücksichtigung der Peronosporagefahr *Landwirtschaftliche Fachpresse für die Tschechoslowakei*, Tetschen, 1927, 5 Jahrg, Nr 7, S 54-55.

Esmarch, F Sollen wir trocken beizen oder nicht? *Die kranke Pflanze*, Dresden, 1927, 4. Jahrg, Heft Nr.2, S 22-29; Heft Nr 3, S 37-41

Essig, E O Spray calendar for Southern California *American Fruit Grower Magazine*, Chicago, Ill., 1927, vol XLVII, no 2, p 38.

Ferraris, T. Necrosi corticale del pero provocata dalla *Cytospora m-crospora* Rabb. *Curiamo le Pianta* 1 e *La Difesa delle Pianta contro le Malattie ed i Parassiti*, Alba, 1927, anno IV e XXII, n 3 pp 44-46, fig 1, tav III

Ferraris, T Seccume fogliare del carciofo prodotto da *Pannularia Cynarar* Sacc. *Curiamo le Pianta* 1 e *La Difesa delle Pianta contro le Malattie ed i Parassiti*, Alba, 1927, anno IV e XXII, n 3, pp 53-54, fig 1 2

Ferraris, T Seccume primaverile delle foglie del grano, prodotto dalla *Septoria Tritici* Desm. *Curiamo le Pianta* 1 e *La Difesa delle Pianta contro le Malattie ed i Parassiti*, Alba, 1927, anno IV e XXII, n 4 pp 72-74, figg 1-2

Flachs. Bestehen Zusammenhänge zwischen dem falschen Meitau und der Doldenbraune des Hopfens? *Praktische Blätter für Pflanzenbau und Pflanzenschutz*, Freising-München, 1927, IV Jahrg, Heft II, S 255-258

[Falscher Meitau - *Pseudoperonospora Humuli*, Doldenbraune disease of origin not yet well defined]

Folsom, DONALD. Uniformity of nomenclature for the viroses of *Solanum tuberosum* *Phytopathology*, Lancaster, Pa., 1927, vol 17, no 3, pp 161-165

[Viroses = virus diseases]

Fonzes-Diacon. Le mildiou. Que peut-il sortir des nouvelles expériences de M. Villedieu? *Le Progres Agricole et Viticole*, Edition de l'Est-

Centre, Montpellier, 1927, 48^e année, n°19, p 456-458

Fracker, S B and Granovsky, A. A The control of the hemlock spanworm by airplane dusting *Journal of Economic Entomology*, Geneva, N.Y., 1927, vol 20, no 2 pp 287-294

[Hemlock spanworm = *Ellopha fiscellaria*, Guenet]

François, Edm Sur deux ennemis de la pomme de terre à Madagascar. *Revue de Botanique Appliquée et d'Agronomie Coloniale*, Paris, 1927, 7^e année, Bulletin n°67, p 172-175.

[*Heterolera radicola*, *Solanophila pavonia*, Olivier]

Gabotto, L Per la lotta contro le tignole dell'uva in provincia di Alessandria Risultanze degli esperimenti eseguiti nel 1926, esposti nelle relazioni all'gate (Cattedra ambulante d'Agricoltura per la provincia di Alessandria Osservatorio provinciale di Fitopatologia) Casale Monferrato, Stab Arti Grafiche già Fr Torelli, 1927, 42 pp

Gadeau de Kerville, HENRI Description et figuration d'une cécidie nouvelle produite par les larves d'un *Thripide* [Thysanoptère] aux capitules de *l'oryngium Bougainville* Gouan [Ombellacée] *Bulletin de la Société entomologique de France*, Paris, 1927, n°4, p 76-78, fig 2-3

[Observation made in Catalonia (Spain)]

Gardner, MAX W Apple blotch canker eradication *Phytopathology* Lancaster, Pa., 1927, vol 17, no 3, pp 185-188.

[*Phyllosticta solitaria*, E et E]

Giulivo, GIORGIO Attenti alla tignola dell'olivo *L'Istria Agricola*, Parenzo, 1927, anno VII, (nuova ser.), n 7, pp 155-156

[*Prays oleellus* (L.)]

Hähne, HANS Ein Versuch zur Bekämpfung der Rubenaaskafer mit arsenhaltigen Kodern *Anzeiger für Schadlingskunde*, Berlin, 1927, III.

Jahrg Heft 3, S 25-29.

[*Blutophaga opaca*, L.]

Hansen, H. H. Control of internal root of caprifig figs. *Phytopathology*, Lancaster, Pa., 1927, vol 17, no 3, pp 199-200

[*Fusarium moniliforme*, Sheld. var. *Fici*, Calkins]

- Harmer, PAUL M.** Prevention of wind injury to crops on muck land. *Agricultural Experiment Station, Michigan State College of Agriculture and Applied Science, Soil Section, Circular Bulletin No. 103*, East Lansing, Michigan, 1927, 8pp, 6figs.
- Heck.** Muss man die Hexenbesen der Weisstanne verfolgen? *Forstwissenschaftliches Centralblatt*, Berlin, 1927, XLIX. Jahrg., Heft 4, S. 132-140. [*Aecidium elatinum*].
- Hendrickson, A. H.** Spray table for Northern California. *American Fruit Grower Magazine*, Chicago, Ill., 1927, vol. XLVII, no. 2, pp. 16-17.
- Hiltner, E.** Frühliegenbefall und Phanologie. Eine Anregung zu Beobachtungen. *Praktische Blätter für Pflanzenbau und Pflanzenschutz*, Freising-München, 1927, IV. Jahrg., Heft 12, S. 280-282. [*Oscinus frit, L.*].
- Hockey, J. F.** Producing healthy apples. *The Canadian Horticulturist*, Peterboro, Ont., 1927, vol. L, no. 2, p. 26.
- Hopkins, C. J.** *Armillaria* root-rot of fruit trees. *Farming in South Africa*, Pretoria, 1927, vol. I, no. 10, pp. 391-392, 2figs. [*Armillaria mellea* (Vahl) Quéf.].
- Hopkins, J. C. F.** On the nature of bacterial diseases of tobacco. *The Rhodesia Agricultural Journal*, Salisbury, Rhodesia, 1927, vol. XXIV, no. 2, pp. 129-134, 4pl.
- Hopkins, J. C. F.** Diseased plants for examination. Collecting and despatching the material. *The Rhodesia Journal*, Salisbury, Rhodesia, 1927, vol. XXXIV, no. 4, pp. 447-450.
- Howitt, J. E.** Fungus pests of stone fruits. *The Canadian Horticulturist*, Peterboro, Ont., 1927, vol. L, no. 2, pp. 25-26, 1fig.
- Howitt, J. E.** The underlying causes of plant diseases. *The O.A.C. Review*, Guelph, Ont., 1927, vol. XXXIX, no. 6, pp. 265-268.
- Hubault, E.** Une invasion de fidonie dans les pineraies de Haguenau. Epannage d'insecticides au moyen d'un avion. *La Nature*, Paris, 1927, no. 2753, p. 77-80, figs. 1-5. [Control tests, not yet complete, against *Bupalus piniarius* have been carried out at Haguenau, (Alsace) by means of two kinds of dusting materials composed of arsenious acid (As_2O_3), arsenic acid (As_2O_5) and calcium oxide.]
- Huber, I. L. and Neiswander, C. R.** Entomological research on the European corn borer in Ohio. *Journal of Agronomy*, Geneva, N. Y., 1927, vol. 19, no. 2, pp. 128-137, fig. 1. [*Pyrausta nubilalis*].
- Hudson, C. E.** The control of Aphid on black currants. *The Journal of the Ministry of Agriculture*, London, 1917, vol. XXXIII, no. 12, pp. 1121-1127, fig. 1-3.
- Korff.** Massnahmen zur Förderung der Bekämpfung der Hopfenkrankheiten in Bayern. *Praktische Blätter für Pflanzenbau und Pflanzenschutz*, Freising-München, 1927, IV. Jahrg., Heft 11, S. 247-249.
- Korff und Hampf.** Die Bekämpfung der Peronosporakrankheit des Hopfens. *Praktische Blätter für Pflanzenbau und Pflanzenschutz*, Freising-München, 1927, IV. Jahrg., Heft 11, S. 250-254. [*Pseudoperonospora Humuli* (Miyabe et Takah.) Wils.].
- Korotkich, G. I.** First use of airplanes in applying insecticides in RSFSR. *La Défense des Plantes*, Leningrad, 1927, vol. III, no. 6, pp. 479-518, fig. 1-18. [In Russian, with title and summary in English].
- Laubert, R.** Berchtsgadener Schmarotzerpilze. *Centralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten*, II. Abt., Jena, 1927, 70. Bd., Nr. 1/7, S. 45-50.
- Luciano, J.** La mosca del Mediterraneo. El porqué debemos evitar la introducción de este insecto a nuestra isla. *Revista de Agricultura de Puerto Rico*, San Juan, P. R., 1927, año X, vol. XVIII, no. III, págs. 143-144, 1fig. [*Ceratitis capitata*].
- McWhorter, FRANK P.** Fungicidal value of oil sprays. *Phytopathology*, Lancaster, Pa., 1927, vol. 17, no. 3, pp. 201-202.

Mielck, OTFR Beobachtungen über die Krautfäule der Kartoffel im Jahre 1926 *Mitteilungen der Deutschen Landwirtschafts-Gesellschaft*, Berlin, 1927, XLII Jahrg. Stück 6, S. 153

[*Phytophthora infestans*]

Michailov-Senkevitch, I. M Influence du vent latéral et de la hétérogénéité des insecticides sur la largeur de leur dispersion par les aéroplanes. *La Défense des Plantes*, Leningrad, 1927, vol. IV, no. 1, p. 163-166, fig 1-3

[In Russian, with title in French]

Nicolini, G Contro le erbe infestanti in risaia *Bulletino dell'Agricoltura*, Milano, 1927, anno 61^o, n. 17, p. 2

[Deals with the efficacy of copper sulphate against algae infesting rice fields]

Olbrich, St Der Gitterrost auf den Blättern der Birnbaume *Schweizerische Obst- und Gartenbau-Zeitung*, Munsingen, 1927, Nr 8, S. 131-132

[*Gymnosporangium Sabinae*, Wint.]

Parfentjev, I A study on the toxicity of calcium arsenate and arsenite *La Défense des Plantes*, Leningrad, 1927, vol III, no 6, pp 454-462.

[In Russian with title and summary in English]

Parfentjev, I Report of work of the first avio-chemical expedition of the People's Commissariat of Agriculture and the Aviochün *La Défense des Plantes*, Leningrad, 1927, vol III, no 6, pp 518-532.

[In Russian, with title and summary in English]

Passalacqua, T La vaiolatura rossa delle fragole e la forma primaverile della *Ramularia Tulamnei* *Curiamo le Piante e La Difesa delle Piante contro le Malattie ed i Parassiti*, Alba, 1927, anno IV, XXII, n. 4, pp 70-72, fig 1, tav IV

[*R. Tulamnei*, Sacc., *Septoria Fragariae*, Desm., *Sphaerella Fragariae* (Tul) Sacc.]

Rabaud, E et Millot, J. Sur les guêpes (*Polydus gallicus*) infestées par les *Stylops* *Comptes rendus hebdomadaires de la Société de Biologie et des ses filiales*, Paris, 1927, tome XCVI, n° 13, p. 944-946

Rambousek, Fr Berichte des Forschungs-Institutes des ösl Zuckerindustrie CDLXVI Die Rubenschädlinge im Jahre 1926 *Zeitschrift für die Zuckerindustrie der Cechoslovakischen Republik*, Prag, 1927, Jahrg LI (VIII), Nr 30, S. 313-323, Abb 1-3; Nr 31, S. 325-335, Abb 4-14

[With summary in French *Agriotes ustulatus*, Schill. *Pegomya betae* Curtis. *Melolontha vulgaris*, L. *Aphis fabae*, Scop., *Blitophaga undata*, Mull. *Silpha obscura*, L. *Bothynoderes punctiventris*, Germ. parasited by *Itheroa plabea* L. *Othiorrhynchus hirsutus* L. *O. orbicularis* Ill.-L. *Tixis Larinus fanyricus palliatus*, Th. *Atomaria linearis* Staph. *Chaetocnema filiculus* Illig. *Agrotis segetum* Schiff. the larvae of which are destroyed by *Carabus cancellatus* L. and parasited by various Diptera. *Plusia gamma*, L. *Archia carya*, L. *Tipulidae*, *Bibio hortulanus* L., *Athalia colubri* Christ. *Cassida nobilis* L. *C. nebulosa*, L. *Gryllotalpa vulgaris* T. et F. *Julia trionidae* *Heterodera schachtii* Schmidt volcs. etc.]

Sherbakoff, C D Photographing living conidia mounted on agar *Phytopathology*, Lancaster, Pa., 1927, vol 17, no 3, pp 195-198, fig 1

Traut, I I Note of a method of poisoning ground squirrels with chemical preparations in the pestiferous regions *La Défense des Plantes*, Leningrad, 1927, vol III, no 6, pp 537-551

[In Russian, with title and summary in English]

Ugrjumov, G. The Laboratory for the study of poison substances of the Plant Protection Department of the People's Commissariat of Agriculture, its tasks and functions *La Défense des Plantes*, Leningrad, 1927, vol III, no 6, pp 449-454

[In Russian, with title in English]

STATISTICS

Production estimates and crop conditions.

Prospects for the wheat crop in the Northern Hemisphere have improved, according to recent reports received by the Institute. As the weather has been favourable in the spring wheat areas of Canada and the United States, there is a considerable increase in the estimates. Based on the the situation at the end of August it is estimated that this year Canada and United States together should have a production of about 36 million metric tons which would be the highest crop on record with the exception of 1915 (38.6 million metric tons) as shown in the following tables.

WHEAT PRODUCTION IN CANADA AND THE UNITED STATES
(thousands of metric tons)

1927	35,915	1918	30,224
1926	33,805	1917	23,689
1925	30,190	1916	24,470
1924	30,659	1915	38,629
1923	34,608	1914	28,639
1922	34,493	1913	27,083
1921	30,367	1912	25,976
1920	29,835	1911	23,195
1919	30,990	1910	20,880

In Europe, the production of wheat, based on available data will be slightly higher than that of last year, but the estimates for some important countries are still lacking. Information on crop conditions in those countries, support the favourable conclusions already shown by the totals in spite of damage caused by excessive rain in various zones of North and Western Europe and by drought in some parts of Southern Europe.

Taking also into account the production of Asia and North Africa it is expected that the total production of wheat in the Northern Hemisphere will be higher than that of 1926 and still higher than the average of the five previous years. This calculation is based on the total of the figures available which are shown in the table on the following page.

The final results of the season will largely depend not only on any modifications of the available estimates but also on the harvest in the Southern Hemisphere where the crops are still growing. The situation

Production of cereals.

(in metric tons)

COUNTRIES	1927	1926	Average 1921-25	1927	1926	Average 1921-25
	<i>Wheat</i>			<i>Rye</i>		
Germany	3,092,940	3,597,185	2 686,700	7,271,565	6,405 905	6,501,288
Austria	285,400	256,864 (1)	241,350	497,800	475,315 (1)	427,191
Belgium	385,944	348,384	359,066	510 002	510,762	522,350
Bulgaria	1,218,000	1,117,600	854,537	205,850	203,400	148,110
Spain	4,052,832	3,989,824	3,876,075	688,167	597,044	704,167
Finland	24,450	25,144	20,116	307,050	302,490	287,457
Great Britain and Wales	1,413,321	1,324 925	1 582,594	—	—	—
Greece	361,971	304,019	255,873	30,912	35,875	21,319
Hungary	2,044,507	2,038,682	1,624 202	569,255	708,001	681,759
Italy	—	—	—	163,000	165 000	154,540
Latvia	76,720	50,615	38,805	316,530	155,437	242,200
Lithuania	130,600	113,765 (1)	101,906	534,100	350,809 (1)	594,793
Luxemburg	19,180	16,925	10,668	8,328	8,973	8,877
Norway	15,909	15,961	17,339	16,050	16,433	19,797
Netherlands	148,400	149,324	168,598	345,300	346 563	410,200
Poland	1,485,000	1,281,316	1 199,140	5,984,400	5,011,426	5,121,820
Portugal	307,010	232,372	900 438	112,475	92 412	129,685
Rumania	2,678,725	3,017,761	2,437,724	247,728	285,574	212,630
Sweden	304,400	336,468	288,555	477,500	562 488	556,564
Switzerland	162,800	153,000	132 560	42,100	40,200	41,745
Czechoslovakia	1,030,657	928,839	980,182	1,243,052	1,166,138	1,325,962
<i>Total Europe</i>	<i>19,188,746</i>	<i>18,299,023</i>	<i>17,176 449</i>	<i>19,571,164</i>	<i>17,560,245</i>	<i>18,112,444</i>
Canada	12,485,095	11,153,416	10,179,436	443,552	307,705	530,880
United States	15,044,107	17,062,500	14,984,934	1,562,161	1,016,650	1,727,451
{ winter						
{ spring	8,885,980	5,589,513	6,900 834	—	—	—
Mexico	302,306	278,811	283,963	—	—	—
<i>Total America</i>	<i>36,217,438</i>	<i>34,084,240</i>	<i>32,349,167</i>	<i>2,005,713</i>	<i>1,324,355</i>	<i>2,258,331</i>
Korea	272,339	236,220	268,287	—	—	—
Great Lebanon	33,000	23,800	30,820	—	—	—
British India	9,091,539	8,835,545	9,141,375	—	—	—
Japan	755,900	778,754	732,197	—	—	—
<i>Total Asia</i>	<i>10,152,848</i>	<i>9,919,319</i>	<i>10,172,679</i>	—	—	—
Algeria	900,000	640,962	727,096	—	—	—
French Morocco	675,000	440,200	539,406	—	—	—
Tunis	160,000	355,000	228,551	—	—	—
<i>Total Africa</i>	<i>1,725,000</i>	<i>1,436,162</i>	<i>1,490,053</i>	—	—	—
GRAND TOTAL	67,294,033	63,738,744	61,188,348	21,576,977	18,884,600	20,370,775

(1) Average 1922 to 1925

Production of cereals.

(in metric tons)

COUNTRIES	1927	1926	Average 1921-25	1927	1926	Average 1921-25
	<i>Barley</i>			<i>Oats</i>		
Germany	2 672,146	2,462,541 (1)	2,486 715	6 309,193	6,324,555	5,273,129
Austria	221,400	197,555 (2)	162,635	301,600	434,796 (2)	340,311
Belgium	79,175	91,478	89,863	542,774	786 331	504,457
Bulgaria	337,500	260,600	201,745	164,000	107,600	103,058
Spain	2,082,454	2,009 368	2,008,912	556,736	547,046	525,089
Finland	180,900	156,100	125,884	585,700	592 726	501,196
Great Britain and Wales	838,239	930,099	904,311	1,341,182	1,513,910	1,398,173
Greece	204,572	177,129	135,012	72,169	80,848	59,746
Hungary	498,721	555,389	483,310	306,303	960,007	328,678
Italy	216,000	240, 000	22 1,600	463,900	590,000	545,560
Lithuania	185,200	248,864 (2)	214,976	268,100	319,456 (2)	331,766
Luxemburg	3,500	4,011	3,488	43,050	47,162	30,919
Norway	108,182	111,584	95,430	182,445	193,514	165,555
Netherlands	65,900	77,474	72,308	322,900	327,021	302,633
Poland	1,628,800	1,554 596	1 419,020	3,419,020	3,049,769	2,798,920
Portugal	42,729	32,384	44,565	98,070	68,622	93,235
Rumania	1,331,079	1,684,947	1,208,284	842,845	1,159,029	911,820
Sweden	265,700	323,735	281,320	1,050,700	1,249,130	1,094,064
Switzerland	12,700	12,300	11,603	44,400	45,100	40,493
Czechoslovakia	1,197,936	1,143 061	1,091,219	1,317,126	1,379,886	1,190,657
<i>Total Europe</i>	<i>12,072,833</i>	<i>12,333,815</i>	<i>11,351,200</i>	<i>18,271,993</i>	<i>19,126,308</i>	<i>16,629,459</i>
Canada	2,134,723	2,170,322	1,785 511	7,744,913	5,906 102	7,405,118
United States	5,647,831	4,100,538	4,061,932	17,293,113	18,144,026	19,181,078
<i>Total America</i>	<i>7,782,554</i>	<i>6,270 860</i>	<i>5,847,443</i>	<i>25,038,026</i>	<i>24,050,128</i>	<i>26,536,196</i>
Korea	759,794	834,036	797,022	—	—	—
Great Lebanon	16,500	20,100 (2)	21,225	—	—	—
Japon	1,526,192	1,917,629	1,806,939	—	—	—
<i>Total Asia</i>	<i>2,302,486</i>	<i>2,771,765</i>	<i>2,625,186</i>	—	—	—
Algeria	860,000	500,777	670,133	175,000	126,173	194,786
French Morocco	800,000	509,279	804,573	30,000	9,082	8,420
Tunis	100,000	192,000	149,000	28,500	31,000	35,400
<i>Total Africa</i>	<i>1,760,000</i>	<i>1,202,056</i>	<i>1,623,706</i>	<i>233,500</i>	<i>166,255</i>	<i>238,606</i>
GRAND TOTAL	23,917,973	22,578,496	21,447,535	43,543,519	43,342,691	43,404,761

(1) Average 1923 to 1925. — (2) Average 1922 to 1925

is, on the whole, promising in Australia except in New South Wales where drought is reported. In Argentina the wheat situation is good but rain is needed.

It is estimated that the production of *rye* both in Europe and North America will be higher than last year.

From data available the total production of *oats* and *barley* in Europe is slightly below that of 1926 : the figures are lacking for several important producing countries which however will not change to any great extent the situation. For North America the crop estimates are more favourable than last year both for barley and oats.

The outlook for *maize* production is more or less poor, in Europe, on account of the drought. The United States estimates of production have slightly improved, but the new estimate (62 millions metric tons) is considerably below that of 1926 (67 millions metric tons) and the average for the previous five years (72 millions metric tons).

The production of *potatoes* on the basis of the crop condition at the end of August is judged to be abundant and much greater than in 1926 which was an unfavourable year. Extremely wet weather damaged in some regions the quality of the produce. In North America a bigger crop than the previous years' is expected and nearly equal to the average crop of the last five years.

The crop condition of *sugar beets* is generally promising in the European producing countries. The quantity of beets will certainly be greater than that obtained in the preceding year also, because the acreage intended for this crop has been increased. In the United States the production will be slightly below that of 1926 and the five previous year's average in spite of the extension of this crop.

The prospects for *vine* production are not very good as far as concerns quantity, but the quality should be good in Italy, Southern France and Switzerland, while in Spain the results of the vintage were most favourable. A crop practically equal to the average is reported from the vine growing countries of North Africa.

The situation of the *olive* crop is variable in the various growing districts of Italy, but on the whole production is expected to be rather small and of poor quality. The prospects of this crop in Spain are very good and in Algeria it is estimated that production will be higher than that of 1926 but probably below the average. In Tunis drought and hot winds were very detrimental to the crop, while prospects are splendid for Morocco.

The estimated production of *cotton* in the United States, based on the crop condition at the beginning of September, shows a decrease of about 170,000 metric tons compared with the previous month's estimate, which makes the present estimate about 30 per cent. below the exceptionally good crop of 1926. The production in Egypt is estimated to be smaller by about 12 % than last year and by about 3 % as compared with the five previous years' average.

Countries	Wheat (August 1-May 31)		Wheat flour (August 1-May 31)		Rye (August 1-May 31)		Barley (August 1-May 31)		Oats (August 1-May 31)	
	1926-27	1925-26	1926-27	1925-26	1926-27	1925-26	1926-27	1925-26	1926-27	1925-26
Germany	1,871,788 +	886,247 +	40,753 +	107,587 +	272,494 +	167,992 +	1,847,010 +	986,965 +	54,096 +	194,407 +
Austria	(1) 205,383 +	204,700 +	130,044 +	94,734 +	(1) 74,922 +	72,545 +	(1) 57,093 +	69,875 +	(1) 60,187 +	60,187 +
Belgium	873,492 +	872,413 +	3,907 +	11,143 +	80,922 +	391,590 +	221,233 +	246,415 +	65,010 +	111,647 +
Denmark	77,603 +	85,158 +	51,687 +	35,486 +	131,249 +	181,593 +	8,280 +	21,157 +	14,864 +	663 +
Spain	(2) 232 +	15,000 +	(2) 8,121 +	6,134 +	(2) 1,342 +	21 +	(2) 12,301 +	18,678 +	—	—
Estonia	12,674 +	15,090 +	5,722 +	5,722 +	94,342 +	45,967 +	1,678 +	5,928 +	4,659 +	9,293 +
Finland	337 +	555 +	81,467 +	83,066 +	96,882 +	127,136 +	981 +	645 +	3,374 +	1,931 +
France	1,236,933 +	725,181 +	1,132 +	18,194 +	98,882 +	17,968 +	25,757 +	32,541 +	40,988 +	176,200 +
Gr. Brit. and North Ireland	4,350,944 +	3,991,488 +	301,111 +	183,912 +	93,056 +	17,968 +	40,618 +	720,678 +	193,169 +	372,049 +
Hungary	359,561 +	271,173 +	122,967 +	148,795 +	93,056 +	17,968 +	40,618 +	720,678 +	32,368 +	52,705 +
Irish Free State	243,402 +	243,565 +	188,317 +	125,342 +	—	—	19,000 +	12,300 +	30,346 +	37,065 +
Italy	1,462,985 +	1,130,539 +	14,509 +	25,678 +	223,292 +	122,693 +	19,000 +	13,810 +	97,197 +	96,168 +
Latvia	37,698 +	35,380 +	682 +	221 +	—	—	—	2,663 +	8,941 +	6,965 +
Lithuania	186 +	874 +	0 +	221 +	9,046 +	10,726 +	—	—	—	—
Norway	79,232 +	74,735 +	41,594 +	61,206 +	44,200 +	58,328 +	3,902 +	1,119 +	475 +	563 +
Netherlands	461,272 +	468,006 +	134,964 +	96,403 +	134,964 +	176,541 +	23,844 +	271,415 +	6,211 +	16,752 +
Poland	138,265 +	129,771 +	3,358 +	6,223 +	60,209 +	128,533 +	237,939 +	271,415 +	73,204 +	91,552 +
Rumania	134,291 +	80,775 +	13,366 +	4,663 +	124 +	262,795 +	91,434 +	152,498 +	21,210 +	73,232 +
Kingdom of Ser. Cr. and Slov.	319,197 +	628,345 +	23,953 +	4,063 +	35,136 +	533 +	64,316 +	254,972 +	90,090 +	10,842 +
Sweden	112,278 +	137,830 +	4,982 +	2,101 +	11,566 +	5,033 +	23,977 +	21,110 +	12,592 +	14,969 +
Switzerland	374,974 +	138,547 +	—	—	29,526 +	9,537 +	98,178 +	16,789 +	9,085 +	20,048 +
Czechoslovakia	247,414 +	129,066 +	122,924 +	214,113 +	58,052 +	162,275 +	168,133 +	71,740 +	120,579 +	132,951 +
U S S R.	(3) 994,750 +	467,141 +	—	—	(3) 821,833 +	173,414 +	(3) 456,925 +	560,522 +	48,401 +	62,493 +
Canada	6,223,166 +	6,293,088 +	702,765 +	786,575 +	168,000 +	102,603 +	741,839 +	550,099 +	54,787 +	350,880 +
United States	3,291,600 +	985,208 +	1,049,530 +	719,575 +	462,789 +	194,031 +	314,393 +	520,129 +	101,236 +	367,134 +
Argentina	3,078,407 +	2,048,079 +	130,357 +	123,913 +	125,875 +	34,508 +	296,016 +	102,136 +	453,024 +	391,990 +
Chile	7,720 +	18,923 +	1,310 +	1,949 +	—	—	96,758 +	45,970 +	60,973 +	46,291 +
Ceylon	62 +	66 +	15,992 +	15,187 +	—	—	223 +	250 +	781 +	983 +
India	17,621 +	36,490 +	53,353 +	50,620 +	—	—	331 +	6,976 +	599 +	650 +
Indochina	—	—	19,421 +	18,744 +	—	—	—	—	—	—
Japan	370,619 +	682,596 +	44,326 +	63,712 +	—	—	300 +	903 +	—	—
Syria and Lebanon	18,645 +	26,348 +	16,477 +	29,548 +	—	—	3,019 +	8,544 +	1,753 +	2,221 +
Algeria	24,529 +	106,548 +	2,042 +	1,576 +	167 +	1,166 +	51,906 +	68,440 +	18,968 +	34,927 +
Egypt	59 +	38,211 +	144,579 +	182,975 +	—	—	12,073 +	6,610 +	—	—
Tunis	12,744 +	44,606 +	1,629 +	909 +	—	—	52,404 +	39,851 +	11,603 +	18,683 +
Union of South Africa	(5) 62,225 +	(5) 100,602 +	(5) 16,229 +	22,700 +	—	—	(5) 777 +	(5) 8 +	(5) 777 +	(5) 1,546 +
Australia	1,719,140 +	1,996,604 +	395,440 +	381,636 +	—	—	38,908 +	12,254 +	1,844 +	1,112 +
New Zealand	36,586 +	53,631 +	28,960 +	81,697 +	—	—	42 +	1,697 +	890 +	2,621 +
Total of imports	12,807,951 +	10,558,977 +	1,297,552 +	1,243,537 +	1,144,637 +	1,061,178 +	3,106,801 +	2,499,293 +	754,893 +	1,384,390 +
Total of exports	16,043,534 +	12,017,231 +	2,630,176 +	2,423,747 +	1,318,992 +	1,065,140 +	2,997,404 +	2,457,146 +	907,374 +	1,418,162 +

(1) July-April. — (2) Six months. — (3) July-February. — (4) September-February. — (5) Nine months.

SURPLUS QUANTITY OF IMPORTS (+) OR OF EXPORTS (—)

Countries	Malze		Lined		Rice		Tea		Coffee	
	1926-27	1925-26	1927	1926	1927	1926	1926-27	1925-26	1926-27	1925-26
Germany	1,007,213	225,124	161,676	118,127	63,699	41,928	4,724	4,041	108,682	92,186
Austria	(+)	112,488	(+)	73	(+)	15,067	(+)	(+)	(+)	(+)
Bulgaria	440,968	323,616	29,776	43,790	18,563	13,608	221	194	32,640	38,044
Denmark	386,848	210,542	6,108	11,565	1,973	2,906	637	466	22,555	21,927
Spain	(-)	66,055	(+)	136,284	(-)	5,844	(-)	(-)	(-)	(-)
France	1,544	268	630	80	687	805	93	86	12,091	11,224
Italy	1,544	268	630	80	687	805	93	86	12,091	11,224
Portugal	440,968	323,616	29,776	43,790	18,563	13,608	221	194	32,640	38,044
G. Brit. and North. Ireland	1,007,213	225,124	161,676	118,127	63,699	41,928	4,724	4,041	108,682	92,186
Hungary	48,076	150,462	140,623	160,063	53,163	64,023	1,221	1,674	193,513	169,740
Irish Free State	173,333	140,901	8,311	1,536	6,505	6,294	320	288	3,167	2,708
Italy	201,385	262,945	20,067	14,070	79,101	57,554	9,452	9,653	212	212
Latvia	102	50	1,649	1,200	814	849	10	113	40,184	40,184
Lithuania	72,726	68,142	7,962	3,500	771	696	83	84	205	237
Norway	77,741	55,614	6,684	6,684	2,024	1,572	153	152	14,259	16,790
Netherlands	67,244	6,419	193,304	145,401	51,478	103,835	11,353	10,564	30,410	36,860
Poland	1,165,476	401,213	8,344	2,214	22,627	8,963	1,751	1,559	55,909	5,761
Romania	303,437	775,146	2,165	2,548	7,003	7,812	320	206	43,045	34,625
Kingdom of the Ser., Cr. and Slov.	70,700	32,550	18,716	16,964	5,982	5,982	610	559	11,853	11,594
Sweden	7,727	231,193	7,182	8,913	26,703	14,522	474	777	10,665	14,767
Czechoslovakia	(-)	100,380	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
U. S. S. R.	(-)	100,380	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
Canada	254,804	153,747	12,704	3,826	8,220	14,808	15,375	15,780	9,943	9,790
United States	291,586	143,259	294,116	233,156	78,203	23,927	41,598	42,578	587,992	588,119
Argentina	3,860,815	1,500,778	928,662	874,054	61	3	(-)	(-)	(-)	(-)
Brazil	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
Chile	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
Ceylon	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
India	45	122	57,456	52,005	1,316,519	1,555,247	90,601	85,855	1,001	1,046
Dutch East Indies	28,622	18,732	45,006	24,758	3,067	3,067	50,250	144,280	22,207	37,100
Indochina	45,006	24,758	3,067	3,067	742,483	746,517	1,461	1,454	952	947
Japan	24,479	11,436	3,068	3,068	392,904	126,941	9,256	10,413	905	781
Syria and Lebanon	1,600	1,628	(-)	(-)	6,156	6,681	109	158	905	781
Algeria	9,901	1,196	73	51	3,544	1,636	610	980	7,763	8,641
Belgium	6,463	6,225	35	105	2,757	20,394	4,503	3,701	8,969	8,963
Belgium	6,463	6,225	35	105	2,757	20,394	4,503	3,701	8,969	8,963
Union of South Africa	(-)	(-)	(-)	(-)	(+)	12,851	(+)	(+)	(+)	(+)
Australia	15,490	28,069	8,125	11,612	11,504	5,778	21,258	18,909	1,157	1,588
New Zealand	1,701	4,284	432	83	2,261	1,526	4,859	4,104	104	176
Total of imports.	5,455,977	3,948,519	875,915	854,077	1,012,446	977,701	303,835	290,644	1,142,067	1,165,985
Total of exports.	5,982,641	4,032,057	1,010,033	936,065	2,225,316	2,407,577	294,617	275,693	706,104	730,580

(1) October April -- (2) Four months -- (3) Ten months -- (4) Three months -- (5) One month only -- (6) Seven months -- (7) Nine months -- (8) Six months,

SURPLUS QUANTITY OF IMPORTS () OR OF EXPORTS (—)

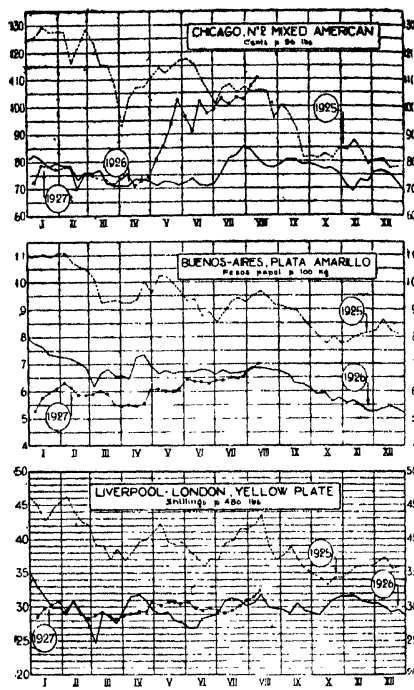
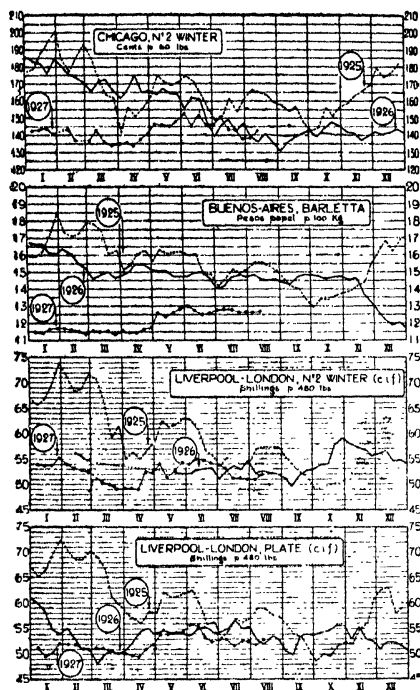
Countries	Butter		Cheese		Cotton		Wool	
	January 1-May 31	1927	January 1-May 31	1927	August 1-May 31	1927-26	September 1-May 31	1927-26
	metric tons		metric tons		metric tons		metric tons	
Germany	40,272 +	36,150 +	25,244 +	19,324 +	399,019 +	255,220 +	143,006 +	84,423 +
Austria	618 + (1)	353 + (1)	909 + (1)	1,070 + (2)	24,091 + (2)	22,514 + (3)	16,555 + (3)	4,016 +
Belgium	253 +	1,642 +	5,678 +	2,516 +	69,843 +	60,680 +	16,865 +	28,696 +
Denmark	56,789 +	55,042 +	1,810 +	2,516 +	5,073 +	4,300 +	835 +	670 +
Spain	(4)	2 +	225 + (4)	181 + (5)	20,924 + (5)	37,033 + (6)	547 + (6)	8,921 +
Estonia	2,686 +	2,686 +	1,490 +	900 +	4,167 +	7,294 +	1,652 +	702 +
Finland	4,017 +	1,303 +	3,528 +	675 +	298,158 +	285,375 +	213,015 +	237,814 +
France	111,483 +	123,214 +	58,246 +	59,932 +	719,756 +	683,205 +	168,338 +	163,387 +
Great Britain and Northern Ireland	139 +	115 +	122 +	55 +	5,439 +	3,676 +	1,301 +	2,006 +
Hungary	2,150 +	404 +	384 +	387 +	190,387 +	184,672 +	4,251 +	3,043 +
Irish Free State	509 +	960 +	10,368 +	11,355 +	100,387 +	184,672 +	29,004 +	34,004 +
Italy	3,193 +	3,216 +	3 +	1,246 +	6 +	1,932 +	392 +	380 +
Latvia	482 +	409 +	200 +	194 +	2,087 +	1,922 +	106 +	271 +
Lithuania	17,384 +	16,728 +	34,043 +	20,049 +	34,039 +	30,456 +	212 +	198 +
Netherlands	1,460 +	1,460 +	415 +	415 +	60,515 +	36,818 +	13,376 +	8,402 +
Poland	50 +	33 +	207 +	415 +	71 +	518 +	120 +	542 +
Rumania	20 +	20 +	299 +	287 +	6,397 +	5,624 +	2,771 +	2,150 +
Kingdom of the Serbs, Croats and Slovenes	8,193 +	6,335 +	202 +	204 +	21,732 +	10,381 +	5,446 +	5,254 +
Switzerland	3,366 +	3,330 +	14,536 +	7,846 +	30,007 +	27,572 +	7,148 +	5,792 +
Czechoslovakia	476 +	1,023 +	1,023 +	1,143 +	100,611 +	111,592 +	10,965 +	9,910 +
U. S. S. R.	(7)	763 +	—	—	—	—	—	—
Canada	3,014 +	3,669 +	5,892 +	5,416 +	57,645 +	54,676 +	3,372 +	3,073 +
United States	1,968 +	381 +	13,706 +	9,361 +	2,362,585 +	1,671,660 +	97,705 +	122,580 +
Argentina	12,538 +	12,607 +	297 +	135 + (8)	12,929 + (8)	7,810 +	133,398 +	124,896 +
Chile	—	—	—	—	—	—	11,455 +	10,144 +
Ceylon	147 +	117 +	31 +	26 +	466 +	904 +	—	—
India	70 +	80 +	205 +	170 +	380,997 +	560,943 +	19,753 +	16,493 +
Japan	115 +	172 +	20 +	27 +	593,396 +	555,875 +	29,797 +	19,092 +
Syria and Lebanon	518 +	343 +	38 +	112 +	126 +	607 +	2,730 +	2,254 +
Algeria	351 +	363 +	1,118 +	1,095 +	303 +	757 +	1,136 +	5,098 +
Egypt	197 +	197 +	1,156 +	1,206 +	800,425 +	280,515 +	1,240 +	1,008 +
United Kingdom	120 +	148 +	250 +	184 +	184 +	184 +	131 +	148 +
Union of South Africa	26 + (1)	28 + (1)	32 + (1)	31 + (9)	1,594 + (9)	1,817 + (10)	97,561 + (10)	85,672 +
Australia	15,852 +	19,303 +	878 +	1,450 +	—	887 +	329,407 +	327,280 +
New Zealand	37,118 +	25,323 +	42,213 +	39,229 +	—	—	91,127 +	97,124 +
Total of imports	106,985 +	170,246 +	111,874 +	105,497 +	2,662,151 +	2,376,077 +	763,130 +	780,245 +
Total of exports	168,107 +	132,526 +	114,431 +	95,100 +	3,048,730 +	2,533,339 +	601,075 +	668,901 +

(1) Four months. — (2) July-April. — (3) October-April. — (4) One month only. — (5) Six months. — (6) Five months. — (7) Two months. — (8) Seven months. — (9) Nine months. — (10) Eight months

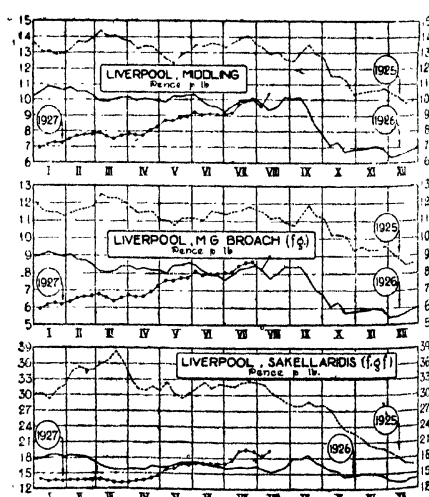
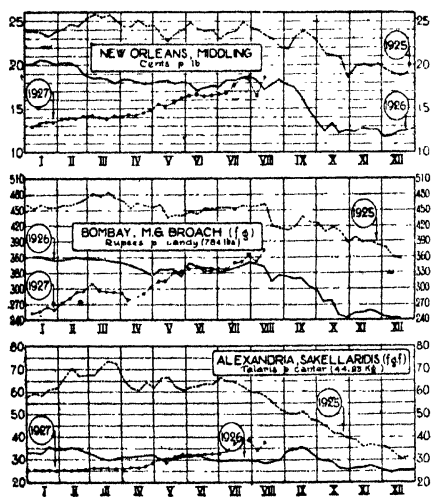
Price fluctuations of Wheat, Maize and Cotton.

Wheat.

Maize.



Cotton



AGRICULTURAL LEGISLATION

I — AGRICULTURAL AND TRADE STATISTICS

Mexico — A Decree issued by the Department of National Statistics, dated 16 June 1927 (*Diario Oficial*, No 40 of 18 June 1927), taking account of the suggestion made by the International Institute of Agriculture in Rome to the Governments of the principal countries regarding the desirability of carrying out a world agricultural census in 1930, introduces a modification into article 33 of the regulations for carrying out the law of 30 December 1922, which fixed the date for taking the agricultural census for the years ending with the figures 2 and 7. It is now arranged that in the future the agricultural census will take place in the years ending in 0 and the industrial census in the years ending in 0 and 5.

II — TRADE IN AGRICULTURAL PRODUCTS, FERTILISERS AND LIVESTOCK.

Argentina — A Decree of the Finance Minister of 17 June 1927 (*Boletín Oficial*, No 9957, of 24 June 1927) abolishes the obligation that imported green coffee should be subjected to previous analysis. Broken coffee and all consignments which show evidence of harmful adulteration or which do not fulfil the conditions mentioned under numbers 1 to 8 of the official Brazil classification are considered as unsuitable for consumption.

Chile — A Decree of 4 May 1927 (*Diario Oficial*, No 14771 of 13 May 1927) allows a reduction of 35 % of the railway tariffs for carriage of wine intended for exportation.

Colombia — An Order, No 397 of 10 May 1927 (*Diario Oficial*, No 20503 of 25 May 1927) forbids the use of artificial colouring substances in the preparation of preserved vegetables intended for consumption, whether coming from abroad or manufactured within the country.

Spain — A Royal Decree of 2 July 1927 (*Gaceta de Madrid*, No 190 of 9 July 1927) allows the free importation of maize subject to the payment of the custom dues. The Government also grants in certain cases in favour of stock breeders, a reduction on the customs tariff amounting to 5 gold pesetas per metric quintal.

United States of America — An Act (*Public*, No 712 — 69th Congress) approved 3 March 1927 is intended to prevent the destruction or dumping

without good and sufficient cause therefor, of farm produce received in interstate commerce by commission merchants, etc. Such merchants are required to account truly and correctly for all farm produce received by them. The Secretary of Agriculture shall by regulation provide for making prompt investigations and issuing certificates as to the quality and grading of produce received in interstate commerce or in the District of Columbia upon application by any person, firm, association or corporation, shipping, receiving or financially interested in such produce. Persons guilty of a breach of the provisions of the Act shall be punished by a fine ranging from \$ 100 to \$ 3000 or by imprisonment for a period not exceeding one year, or both at the discretion of the Court.

France — A Law of 22 July 1927 (*Journal Officiel*, No 173 of 27 July 1927) supplements the Law of 6 May 1919 relating to the protection of denominations showing origin. An addition is made to article 10 of this Law prescribing that independently of the rules relating to origin no wine has the right to assume a denomination indicating its district or local source, unless it comes from vines and a production area which are definitely recognised by local, regular and permanent usage. The area of production signifies the area which includes the communes or parts of communes acknowledged to be the genuine producers of the particular brand. Wines that are the product of hybrid stocks have in no case the right to names denoting origin. This Law also contains new regulations replacing the former articles 17, 18, 20 and 22 of the law of 6 May 1919 relating to the title of "champagne" which can only be used for wines that are made sparkling by fermentation in bottle and are the product of the vintage and treated entirely within the limits of the wine-growing district of Champagne and come from a producing area and from vines that correspond to certain conditions which are clearly set out in this law. The use of all titles deriving from the word "champagne" is subject to the same conditions. The title "Champagne Style" is however allowed for wines other than Champagne which are rendered sparkling by fermentation in bottles. Wines rendered sparkling by fermentation in large containers must show on the label the note "sparkling wines produced in closed vats".

* * A law of 20 July 1927 (*Journal Officiel*, No 170 of 23 July 1927) makes it obligatory to colour artificially meadow clover and lucern seeds imported into France. The law forbids, exception made for seeds already in warehouse or transit, the entry of seeds of red clover and lucern which are not coloured artificially in the proportion of at least 5 % to show their foreign origin. A Decree in the form of a Public Administrative Regulation will lay down the conditions for giving effect to this law particularly as regards the kind of colouring required.

Paraguay — A Decree of 22 April 1927 (*Diario Oficial*, No 1369, of 23 April 1927) specifies the commune Pedro Juan Caballero as the only place authorised for the entry of foreign maté in transit through Paraguay to a foreign destination. The containers holding the maté in transit must be marked with the letters R. P. by a revenue officer to prevent their being confused with those containing maté of national origin, which is required to pay export dues.

Peru — A Law dated 18 May 1927 (*El Peruano, Diario Oficial*, No 140 of 23 June 1927) with the object of checking the rise in the prices of national products, gives permission to the executive authority to reduce custom duties on imported products when the prices of similar national goods stand too high.

Portugal — An Order of 8 June 1927 (*Diario do Governo*, No 126, Series I, 18 June 1927) forbids the importation of potatoes, at the same time authorising for all foreign countries without distinction their exportation, which was previously not allowed except when their destination was the Portuguese Colonies or Brazil

* * Another Order of 2 July 1927 (*Diario do Governo*, No 138 Series I, 2 July 1927) continues in force the abolition of export supertaxes on certain goods, forbids the exportation of poultry, eggs, etc and authorises the exportation of wool, oil, vegetables, onions etc

III — FINANCIAL AND CUSTOMS LEGISLATION

France — A Decree of the Ministry of Agriculture of 10 July 1927 (*Journal Officiel*, No 161, of 12 July 1927) establishes an exportation duty of 5 % *ad valorem* on straws and foddercrops (Tarif n° ex 164)

Mexico — A Decree of 29 April 1927 (*Diario Oficial*, No 6 of 6 May 1927) modifies several items in the importation duties on vegetable foodstuffs, vegetable products, fermented beverages, etc, such as olives, olive oil, cider, etc

IV — ANIMAL PRODUCTION INDUSTRIES IN ANIMAL PRODUCTS

France (French West Africa) — An Order of 18 March 1927 (*Journal Officiel de l'Afrique Occidentale française*, No 1186 of 11 June 1927); lays down certain rules for the control of foot-and-mouth disease. It is the duty of the Lieutenant Governor of the colony as soon as ever a case of foot-and-mouth disease is reported in a herd, to declare infected the area of the locality in which the affected herd is found and also to take every form of precaution for the control of the disease and for checking its diffusion

Italy — A Ministerial Decree of 13 June 1927 (*Gazzetta Ufficiale*, No 161, of 14 July 1927, Vth year) contains regulations for the service of restocking the fish breeding establishments. In this connection municipalities, travelling agricultural professorships, agricultural associations and fishing societies may communicate each year before the 31 July with the Ministry of National Economy in order that they may be supplied with any material they may require

V — AGRARIAN ORGANIZATION AND AGRICULTURAL INSTRUCTION

Chile — A Decree of 22 April 1927 (*Diario Oficial*, No 14762 of 3 May 1927) provides for the replacement of the general Department of agricultural services, which was suppressed by decree No 418 of 20 April 1927, by a *General Agricultural Inspection Service*. This service will act as a consultative

body for the Ministry of Agriculture, Industry and Land Settlement and will have the following duties : to consider the laws, regulations, instructions and other measures referred to it by the Ministry or which the Inspector General considers desirable to bring before the Government ; to reply to questionnaires submitted by the different State services ; to make recommendations for the solution of new problems arising in connection with the development of agriculture on the industrial side ; to submit to the Ministry of Agriculture such recommendations as it considers necessary for improving the work of the Agricultural Development Service (*Fomento*) attached to the Ministry of Agriculture, Trade, and Land Settlement

* * A Decree No 703 of 27 May 1927 (*Diario Oficial*, No. 14,801 of 21 June 1927) sanctions the internal regulations for the General Directorate of Lands, Forests and Fisheries This office depends directly on the Ministry of Agriculture, Industry and Land Settlement and includes the following services : land settlement and emigration, land and cadastral survey, forests and game, sea and fresh water fisheries

France — A law of 17 July 1927 (*Journal Officiel*, No 167 of 20 July 1927) introduces modifications in certain articles of the Law of 2 August 1918 on the organisation of public agricultural education, and also in article 3 of the law of 21 August 1912 relating to departmental and communal agricultural instruction Under this law the Ministry of Agriculture is required to organise sections of practical work at the National Agricultural Institute, practical instruction being given in the schools, stations, laboratories and farms under the charge of the Ministry Amongst others a practical section for instruction and agricultural experimentation is set up, the object of which is to give technical training to the officials of the different services of the Department of Agriculture and the Institute of Agricultural Experiment This Law lays down that pupils who have obtained the diploma of the National School of Horticulture at Versailles shall receive the title of horticultural engineers

Italy — A Decree-Law of 30 June 1927, No 1181 (*Gazzetta Ufficiale* No 163 of 16 July 1927, Vth year) creates the post of a Vice-president of the Permanent Wheat Committee and appoints thereto the Minister of National Economy

* * A Decree-Law of 16 June 1927 No 1071 (*Gazzetta Ufficiale*, No 155 of 7 July 1927, Vth year) makes provision for the establishment of Provincial Economic Offices and Councils and lays down rules for their organisation. The offices will serve as observatories for the local economic and social movement, collecting all relevant data and information, after agreement with other competent institutions and offices in the provinces they make recommendations with the object of increasing production and improving the economic and social conditions of the province They are also responsible for the duties that formerly devolved on the Prefectures as regards trade marks and are required to deliver certificates of origin and to draft official price lists, etc The provincial economic councils make such recommendations as they consider desirable relating to the economic development of the province to the Government and public administrative bodies, they advise on the regulations for the rural police, the control of crop pests, protection

of crops, fairs and markets and on all other questions relating to production, credit, savings, social thrift and vocational instruction; they draft and revise periodically the collections of provincial usages regarding trade and agriculture. The councils consist of official members and also of elected members recommended by the institutions in the province which serve economic ends and by the legally recognised syndical organizations

Rumania — A Law of 20 June 1927 (*Monitorul Oficial*, No. 135 of 22 June 1927) contains provisions for the organisation of an agricultural staff service. This service will consist of specialists with high qualifications in agricultural science. From among the members of the agricultural service and its various sections will be recruited the staff required for agricultural institutions belonging to the State, provinces, communes and corporations of public utility, and any other similar institutions which are under State control. To assist the agricultural service there is a special section of agricultural organisers consisting of persons who have completed their studies in secondary schools and a section of agricultural administrators consisting of persons who have completed their studies in the lower agricultural schools. The agricultural service is responsible through its members for the direction of the agricultural services and institutions, making provision for agricultural instructions, carrying out agricultural surveys and organising and managing farms and stock breeding

VI. — PLANT PESTS PLANTS AND ANIMALS HARMFUL TO AGRICULTURE.

Belgium. — A Ministerial Order of 26 June 1927 (*Moniteur Belge*, No. 182 of 1 July 1927) lays down rules for the importation of fresh cherries of French origin. The importation into Belgium of cherries from France is subject to the production of a certificate delivered by the French phytopathological service. This certificate must show that the fruit comes from a district which is free from "*Rhagoletis*" and that the particular consignments have been pronounced free from "*Rhagoletis*" by the competent service.

Consignments which are not accompanied by the prescribed certificate will be rejected on arrival unless it is shown by tests carried out by the special Belgian phytopathological service that they are free from "*Rhagoletis Cerasi*".

Chile. — A Decree of 4 May 1927 (*Diario Oficial*, No. 14769 of 11 May 1927) elucidates the text of Decree No. 190 of 23 March 1927 (1) and states that the free importation of tropical products is allowed at all the ports lying between and including Arica and Chanaral, with the exception of bananas, pine apples and dates, which may be imported at all the ports lying between and including Arica and Huasco

Spain. — A Royal Order of 24 June 1927 (*Gaceta de Madrid* No. 181 of 30 June 1927) contains certain explanations of points in Royal Decree No. 832 of 29 April 1927 relating to phytopathological inspection (1). This inspection, as also that for the quality of live plants, saplings, branches,

(1) See *International Review of Agriculture*, No. 5, June 1927, p. 634.

shoots, roots, tubercles, leaves, seeds, etc., intended for exportation, will take place at the ports and custom houses at which these products leave the country. If however the amount of material is large and packed in closed and sealed containers and the exporters so desire, the inspection may take place with such guarantees as are required, at the railway station of origin at the charge of the persons interested. Mixed commissions (*Juntas*) may also be set up at the request of the interested persons at other places than ports and custom houses when the importance of the trade export movement in plants and plant parts justifies such a course.

Italy (Eritrea). — A Decree of 14 May 1927 (*Bollettino Ufficiale della Colonia Eritrea*, No. 10 of 31 May 1927, Vth year) forbids the introduction and the transit through Eritrea of banana plants and fruits, the object being to protect the native banana crops against the insect pests known under the following titles: *Pseudococcus Comstocki* and the Argentine ant (*Iridomyrmex humilis*) and also against the cryptogams *Thielaviopsis paradoxa* and *Fusarium cubense*.

VII. -- AGRICULTURAL CO-OPERATION, INSURANCE AND CREDIT.

France (Morocco). — A Dahir of 15 June 1927 (*Bulletin Officiel*, No. 765 of 21 June 1927) deals with the foundation of a Central Bank of Native Agricultural Thrift and Mutual Benefit Societies. The objects of this bank are to facilitate the work carried out by these societies, to receive grants from the State in the form of repayable loans; to manage the benefit funds and also the reserve funds of the societies and to make loans. The Central Bank is controlled by a managing committee of which the Director General of Native Affairs is chairman.

Grand-Duchy of Luxembourg. — A Law dated 26 June 1927 (*Mémorial du Grand-Duché de Luxembourg*, No. 34 of 1 July 1927) grants civil status to societies whose object is the establishment and management of thrift and loan banks. These associations will enjoy the benefits of the Law of 27 March 1900 relating to Agricultural Associations, provided that they are constituted in accordance with the provisions of this law.

Peru. — A Law of 4 March 1927 (*El Peruano*, *Diario Oficial*, No. 109 of 16 May 1927) provides for the foundation of a limited liability company, called the "*Crédito Agrícola del Perú*" with head quarters at Lima and a share capital of 750,000,00 Peruvian Pounds divided into 75,000 shares, each of the value of 10 pounds. These shares are divided into 3 series each consisting of 25,000 shares: series A will be subscribed by the State, series B by the banks and series C by the public, preference being given to farmers.

The "*Crédito Agrícola del Perú*" has the power to carry out the following operations: (a) to make loans to farmer owners under the guarantee of the agricultural pledge in accordance with the regulations of law No. 2408, (b) to arrange mortgages with farmer owners up to 80 % of the value of the security; (c) to make loans on special terms of security to working farmers; (d) to make loans to local credit societies; (e) to make loans to agriculturists working on cultivated properties on mortgage security up to 50 % of the

value of the security, repayable within a period not exceeding 15 years; (f) to warehouse agricultural products and also to make advances on agricultural products, undertaking responsibility for their sale either within the country or abroad; (g) to purchase and hold for future sale cotton and sugar crops and other agricultural products, (h) to effect crop and stock insurances with national or foreign companies against loss by sickness, infectious diseases and flood; (i) to issue agricultural bonds, etc.

VIII. — RURAL HYGIENE AND POLICE.

Regency of Tunis. — A Decree of 28 May 1927 (*Journal Officiel Tunisien*, No. 50 of 22 June 1927) provides for the prevention of forest fires. Rules are laid down forbidding the lighting of any fire in the forests. These rules are applicable to owners and extend also to charcoal making, otherwise than in moveable closed apparatus officially recognised as conveying no risk of fire, the distillation of tar and resin and generally all forms of industry in which fire is used. Exceptions from the rules may be granted provided that atmospheric conditions are such as to obviate any fire risks.

AGRICULTURAL ASSOCIATIONS

I. GENERAL NOTICES

Denmark. Landboudsraadet Kobenhavn (Danish Agricultural Council. Copenhagen). – The following organisations are now grouped to form the Danish Agricultural Council:

The Central Committee of the Co-operative Societies of Denmark (*de samvirkende danske Andelsselskaber*), the Federation of Danish Agricultural Societies (*de samvirkende danske Landboforeninger*), the Royal Agricultural Society of Denmark (*det Kgl danske Landhusholdningsselskab*)

The general business of the Council is administered by an Executive Committee consisting of three members, and the Council itself is composed of 15 members elected by the above organisations.

The work of the Council is :

(a) to encourage the collaboration of agricultural economic and vocational organisations wherever such collaboration may be of advantage to agriculture and may effect the solution of those problems of general interest which are beyond the competence of the individual organisations ; (b) to submit to the Government and to the Parliament legislative proposals relating to the vocational interests of agriculture , (c) to watch the interests of agriculture in its relations with the other industries of Denmark ; (e) to oppose the formation of trusts and syndicates.

Dutch Indies. Deli Planters-vereeniging, Medan (Deli Planters Association, Medan) This association was founded in 1879 with the object of safeguarding the agricultural and industrial interests of the east coast of the island of Sumatra in general and of tobacco growing in particular

The Association possesses an agricultural experiment station and a laboratory, and a pathological laboratory is also conducted under this association jointly with the Rubber Planters' Association

In addition the Association regulates and makes provision for importation of coolies from Java and from China, maintains and facilitates relations between the planters and the Government and deals with the labour conditions both of European and of native workers

The general business is in the hands of an Executive Committee of five members, assisted by a Secretary.

CURRENT NOTICES

AGRICULTURAL INSTRUCTION AND EXPERIMENT.

Agricultural Experiments in Algeria. — At the present time experiments are carried out by numerous institutions between which proper co-ordination exists under the superintendence of specially appointed Inspectors. Among the most important is the "Jardin d'Essai du Hamma" at Algiers, which is both a teaching institution and an botanical research station, specially organised for the introduction and acclimatisation of new plant species in North Africa.

Next come the farms of the Agricultural Institute of Maison-Carrée :— (135 ha. at Maison-Carrée, including ampelographic collections (over 1800 varieties of vines), crops of selected cereals, etc.) ; 15 ha. at Rouïba, including an experimental vineyard and orchards ; 430 ha. at Berteaux, undertaking the cultivation on a large scale of cereals and forage crops as well as cattle breeding. Next, the Botanical Station of Maison-Carrée (12 ha.) with important collections of plants ; the farms of the School of Agriculture at Philippeville (180 ha, crops of the littoral), and of the School of Agriculture, in course of installation, at Sidi-Bel-Abbès (195 ha., crops of the Oran plateau), the experimental farm-school of Ain-Temouchent (Depart. of Oran, 100 ha. of crops on a large scale), and lastly the experimental farm-school of Guelma (Depart. of Constantine, 130 ha.). Besides these institutions, which also provide for instruction, several Experimental Stations have been created :— in the Department of Oran, the Ferme-Blanche Station (cotton-growing, grass crops, utilization of salt lands, fruit-growing) and the Ain-el-Hadjar Station (fodder crops, varieties of cereals for semi-arid land, cattle-breeding) ; in the Department of Algiers, the Station of Orléansville (cotton-growing, irrigated crops, production of raisins, apricots) ; in the Department of Constantine, the Station of Barral (tobacco-growing, cotton-growing). There is also a sheep-breeding Station at Tadmert, while a similar Station is to be installed near Murnia (Depart. of Oran).

In addition an experimental vineyard will be started at Duzerville, an Experimental Station opened at Boufarik for the growth of citrus fruit, fruit and tobacco, and large nurseries will be installed at Mechtras (District of Bougie), at Guelma, Arris, Miliana, Orléansville, Inkermann, and Tlemcen.

Lastly there are the Experimental Stations of Aïn-ben-Nou, near Biskra, intended to popularise the improvements to be made in the export trade and utilization of dates, and to stimulate exploitation of the palm-groves of Southern

Algeria, and the El Arfiâne Station, on the Biskra-Touggourt, the work of which is to collect the data required in view of the cultivation of the Sahara oases. (P. CHERVIN :— *L'expérimentation agricole en Algérie. Journal d'Agriculture pratique*, y. 91, n. s., V. 48, n°. 29. Paris, 1927).

Movement for Popularisation of "Mole-plough,, Drainage in the Country Districts of France. — The " Société nationale d'encouragement à l'agriculture ", in view of the fact that many farmers are reluctant to start draining their land by means of earthenware drain-pipes, on account of the high cost of this system of drainage, has, in conjunction with the Minister of Agriculture, sent a mission to England to examine on the spot the operation of mole plough drainage which is commonly practised in English country districts.

As a result it has been decided to appoint a special Committee for the investigation of this system of drainage. As chairman of the Committee M. RINGELMANN is appointed Director of the " Station d'essais de machine ", and the technical management of the necessary experiments has been put in charge of M. COUPAN, Professor of Rural Engineering at the Grignon School of Agriculture. The programme to be followed in the matter includes :— a) investigation of the conditions under which mole plough drainage could be generally introduced into France ; b) organisation of suitable experiments and demonstrations ; c) methodical examination of results obtained ; d) popularization of this system of drainage.

For information, apply to the *Comité d'étude et d'expériences du drainage en galerie* at the *Société d'encouragement à l'agriculture*, 5, avenue de l'Opéra, Paris. (*La vie agricole et rurale*, y. 16, v. XXXI, n° 27. Paris, 1927).

Rubber Experiment Station in Ceylon. — From the beginning of 1926 15 acres of jungle have been granted for the Rubber Research Scheme, the object being to form the nucleus of an experimental station. Of this area 13 acres have been prepared and planted with seedlings taken from known varieties of rubber trees with a view to yield trials. The Station has received from a large number of rubber farms in different districts of the island numerous data relating to trees of high yield and has analysed bark samples of these. All the data obtained on this point are being examined in order to determine what are the factors which influence the quantity and the quality of the latex. (*India Rubber World*, Vol. LXXVI, No. 4, July 1927).

Irrigation Works in Chile. — Last February the Council on Public Works approved the scheme for damming the Laguna River in Coquimbo. It is expected that the construction of the dam will take about six years and will cost approximately 5,000,000 pesos. With the completion of this dam, water will be supplied for 5,000 hectares in addition to 7,000 hectares of land already under irrigation. Estimates place the benefits thus provided to farmers in the area at 36,000,000 pesos. (*Bull. of the Pan-American Union*, Washington D. C., June, 1927).

The Vegetable-Canning Industry in Haiti. — Last January an experiment in the canning of domestic-grown vegetables was begun in Haiti, for

the purpose of developing the industry in the island, which now imports annually approximately 7,114 kilos of canned vegetables. This work will in the first instance be confined to tomatoes, and it is being carried out on a scale sufficiently large to determine not only the keeping quality of Haitian tomatoes, but also their sale possibilities, the cost of production and the probable profits to be gained by the establishment of an industry of this kind. Fruits and other vegetables will also be made the subject of experiment at a later stage. (*Bull. of the Pan-American Union*, Washington, D. C., June 1927).

The Preservation of Natural Scenery in New Zealand. — For about twenty years the New Zealand Government has followed its policy of acquiring land for the sake of preserving the beauties of some of the natural features of the island. From a small beginning the area of scenic preservations in the Dominion has now grown to 454,000 acres. The last annual report of the Department of Lands and Survey records the addition during 1925-26 of 3067 acres, including an area surrounding the picturesque Wairoa Falls, a kauri Forest on the Waitakerei ranges, an area of the limestone rocks of Waro, etc. Part of Motanaura Island will be reserved on account of its historic interest, since it was there that Captain Cook in 1770 proclaimed British sovereignty over the South Island. (*Nature*, London, 1927, vol. 119, No. 2990, p. 291).

The Activity of the British Guiana Sugar Planters Experiment Station at Sophia. — Some account is given of this institution in a recently published report on the work accomplished from 1 October 1925 to 30 September 1926. In particular some new hybrids of sugar cane have been tried with a view of obtaining sugar cane varieties immune to mosaic disease. A comparison of the varieties "Zawenga", "Bamboo" and "Uba" has shown that the first has the larger yield and accordingly experiments with this variety will be continued and extended, as all three have shown immunity to mosaic disease.

For 1926-27 important investigations are projected, such as on soil acidity and the exchangeable bases in soils, on aluminium toxicity and fertility of the soil, on root systems of cane varieties, etc. (*Annual Report of the British Guiana Planters Experiment Station in The Journal of the Board of Agriculture of British Guiana*, Vol. XX, No. 2, Georgetown, 1927).

Handsome Indian Foundation for promoting the Development of Agriculture in the Punjab. — Last year Sir GANGA RAM of Lahore gave the Punjab Government the sum of 25,000 rupees for the foundation of a competition for a money prize to be awarded for any discovery, invention or practical method calculated to promote the development of agricultural production in that Province. The amount has been deposited with the Treasurer of Charitable Endowments of the Punjab and is administered by a special Committee. With the interest derived from the investment of the amount deposited a prize will be awarded based on an international competition to be held every three years. This "Maynard Ganga Prize" will be about 3000 rupees.

Applications for entry to the first competition should be addressed to the Director of Agriculture of the Punjab before the 1st January 1929. (*From Communication sent to the International Institute of Agriculture*).

Experiments in Italy with Retorts for Carbonization of Wood.

— In some Italian State forests these experiments have been carried out with favourable results. In addition to a larger yield than is obtained from the usual old fashioned charcoal kilns, recovery of by-products of carbonization also becomes possible (*L'Esportatore Italiano*, y. VI, n. 7. Milan, 1927)

Agricultural Instruction in Mexico. — In the current year steps have been taken by the Mexican Government to establish centres of agricultural instruction in every State of the Republic. The following places form the headquarters of the new schools: Atlixco, State of Puebla; Jiménez, State of Chihuahua, and Tenancingo, State of Mexico (*Experiment Station Record*, Vol. 56, No. 8. Washington, June, 1927).

AGRICULTURAL AND SCIENTIFIC ASSOCIATIONS AND INSTITUTIONS

International Association of Superphosphate Manufacturers. —

This important organisation the formation of which was announced in an earlier number of this *Review* held its first general meeting at Hamburg on 1 June 1927. The movement towards an international co-operation in the superphosphate industry was initiated as early as 1922 by M. MATHIASSEN of Helsingfors, Sweden, but it was not till June of 1926 that the principle of founding an international Association was laid down at a conference called for the purpose at Paris. The Association was definitely constituted in the following December. At the present time the membership includes 18 nations: South Africa, Northern Africa, Austria, Belgium, Czechoslovakia, Denmark, Finland, France, Germany, Yugo-Slavia, Norway, Poland, Spain, Sweden, Switzerland, United States, Hungary. At the first general meeting delegates of all these countries were present.

A considerable amount of work has already been accomplished by the Association. An Experiment Station has been organised in Hamburg, and an expert put in charge of the research work which is to be carried out. A propaganda office under the direction of M. EGGERS has been instituted in Hamburg (Hammer Landstrasse 231). M. E. G. MARTENS has been elected chairman of the Association.

The next annual meeting will be held in Stockholm, in June 1928. (*The Fertiliser, Feeding Stuff and Farm Supplies Journal*; Vol. XII, No. 12 London, 15 June 1927).

Protection of the Sugar Market in the State of Pernambuco, Brazil.

— The Government of the State of Pernambuco, with the object of safeguarding the interests connected with the sugar industry in its territory, is proposing to establish a special Institute for the purpose. It will be the business of this organisation to intervene on the market to prevent the fall of sugar prices, by placing restrictions on the existing quantity of the commodity on any given market, and by arranging for storage of surplus stocks.

A special fund will be provided for the working of the Institute, to be constituted by means of a tax to be imposed on the imports into Recife of sugar and

its derivatives, and on the sale of these commodities. (*United States Commerce Reports*, 2 May 1927).

• **Reorganization of Government Services for Industry and Commerce in Chili.** — In March last these Services were reorganized by the creation of a " Dirección de Fomento Industrial y Comercio ", which was formed by the amalgamation of certain previously existing organisations and particularly by uniting the " Oficina de la Propiedad Industrial " (Marcas Comerciales, Patentes y modelos industriales), the " Sección Comercio " of the Ministry of Public Works and Communications (*Ministerio de Obras Publicas y Vías de Comunicación*) and the " Servicio de Estudios Económicos ". (*Communication sent to the International Institute of Agriculture*).

The Agricultural Bureau at Guayaquil. — The Agricultural Bureau established several months ago by the Ministry of Agriculture in Guayaquil for the benefit of farmers and stock breeders of the coastal region has rendered very valuable service by disseminating information of interest to such persons. Particularly important work was accomplished in connection with a recent outbreak of anthrax. The Minister of Agriculture now intends to establish a livestock quarantine station in connection with the Bureau in question. (*Bulletin of the Pan-American Union*, Washington, July 1927).

The Soil Science Bureau of the United States incorporated with the Bureau of Chemistry. — Recently the sections undertaking scientific research in the old Bureau of Chemistry, in the Bureau of Soils and the Fixed Nitrogen Research Laboratory have been amalgamated in a new Bureau of Chemistry and Soils. The remainder of the scheduled work of the Bureau of Chemistry will be carried on in conjunction with that of the Insecticide and Fungicide Board under the management of a new Food, Drug and Insecticide Administration. Dr C. A. BROWNE, Head of the Bureau of Chemistry, has been designated as temporary Director of the new Bureau of Chemistry and Soils and Dr. A. G. MC CALL, of the Maryland University has been placed at the head of the Soil Science Section. (*Science*, Vol LXVI, No 1679 New York, 1927).

The National Institute of Agricultural Botany, Great Britain. — Active work for the encouragement of agricultural progress in the United Kingdom is being done by this Institute, of which there are already more than 400 fellows, including many statesmen and leaders of the agricultural world. The aim of the Institute is to improve the yield and quality of farm crops by encouraging the use of better varieties and better seeds, taking into account the conditions of each district. The significance of the undertaking can be measured from the facts that the difference in value between two varieties often amounts to over 20 per cent., and that an addition of 3 per cent to the yield would increase the value of the corn and potato crops by over a million pounds a year.

The present work of the Institute falls into three branches: (a) the Crop Improvement Branch. For this part of the work there is a trial ground at

Cambridge, and five sub-stations in other parts of England, for accurate field testing of old and new varieties of agricultural plants. The branch is also prepared to undertake the introduction of new varieties of merit by arrangement with breeders. (b) The Official Seed Testing Station for England and Wales. Twenty-five thousand seed samples are tested every year for purity and germination, and at a nominal fee farmers are insured against the loss entailed by sowing dead or dirty seeds. The investigation of seed-borne diseases, and of the numerous problems that seeds present to agriculturists are other important features of the Station's work. The Station is operated by the Institute on behalf of the Ministry of Agriculture and Fisheries. (c) The Potato Testing Station. At this branch, which is situated at Ormskirk (Lancs.), the Official Wart Disease Immunity Trials are carried out for the Ministry, and the Institute conducts yield and maturity trials of leading potato varieties. In order to prevent old varieties being marketed under new names, at high prices, the Potato Synonym Committee reports annually on the stocks entered for the Immunity Trials. The latest development is a field investigation of the virus diseases that are now believed to reduce the country's potato crop by approximately one million tons a year.

A copy of the last annual report with full particulars of the activities of the Institute can be obtained by writing to the *Secretary, N. I. A. B., Huntingdon Road, Cambridge.* (*The Journal of the Ministry of Agriculture*, Vol. XXXIV, No. 4, July 1927).

Prize Competitions for Tree planting in the Campagna and the Pontine Marshes. — The Minister of National Economy has established prizes of 400 to 5000 *lire* for those cultivators of the Campagna and the Pontine Marshes who in the agricultural years 1927-28-29-30 plant out and grow saplings with good results and particularly for:— a) plantations of poplar made in the Pontine Marshes and in the valley zones of the Campagna, along streams, canals, margins of farm roads or along the boundaries of holdings; b) plantations of other species of timber and foliage trees made in the hill zones or plateaux of the Campagna for the formation of small woods or thickets for covering or consolidating embankments or on the margins of farm roads; c) cultivation of mulberry, made in the two areas, viz. the Campagna and the Pontine Marshes. Prizes of from 2000 to 4000 *lire* per ha. have also been instituted in favour of those who plant, in the same areas, during the year 1927-28, not less than two ha. of nurseries of poplar or other species of timber or foliage trees. (*Giornale di Agricoltura della Domenica*, y. XXXVII, n. 25. Piacenza, 1927).

Italian Institute of Rural Economy. — The Institute of Economy and Agricultural Statistics, created in 1913 under the Ministry of National Economy, has now been transformed into the Institute of Rural Economy, to which is assigned the duty of collecting and examining, from all points of view, information and data on agriculture, such as to constitute a comprehensive knowledge of the structural physionomy and the specific characteristics of agriculture of Italy and to serve as basis of an agricultural policy adequate to the real conditions of the country. The Office of Agricultural Statistics has been meanwhile

attached to the Central Institute of Statistics. (*L'Esportatore Italiano*, y. VI, n. 7. Milan, 1927).

Italian Medicinal Plants. — The attention of "Associazione italiana pro piante medicinali e aromatiche" has recently been drawn to the considerable importation from abroad of medicinal plants, including the commonest (mallow, belladonna, digitalis, camomile, etc.) although these are to be found everywhere in Italy. The Association has decided to ask the help of chemists, manufacturers etc. to promote the consumption, and therefore the national growing and collection of the plants in question. (*L'Avvenire Sanitario*, y. XXI, n. 26. Milan, 1927).

The Encouragement of Agricultural Work by the Italian State Railways. — The General Directorate of these Railways has established by a special regulation rules for the concession to "Railway Workers Spare Time Institutions" ("*Dopolavoro ferroviario*") of plots of land alongside the permanent way. Consequently the programme of agricultural work which the Railways propose to follow will be enlarged.

The fundamental lines of the scheme are as follows :

To each Spare Time Institute will be assigned an area along the railway line for use for cultivation or rearing small stock. Cropping and breeding will be inspected and directed by a specially appointed expert. Good tillage, sufficient natural and chemical manuring, careful plantation following all the improvements suggested by modern science, will consequently be carried out, and as regards small stock breeding the plan best suited to the circumstances will be adopted, on the understanding that improved methods are to be introduced by degrees.

As regards economic organization, the programme provides for setting up small agricultural industries under each "Dopolavoro". The person to whom the plant is assigned will be responsible for upkeep expenses giving him thus direct interest in keeping such plant in good order.

Normally the expenses of stock breeding, as well as those of cultivation will be borne by the individual.

The Central Office will act as a connecting link between all the "Dopolavoro" Institutes; it will publish small pamphlets with practical and direct reference to cultivation or breeding, giving also when necessary instructions and advice and providing that the purchases made by the "Dopolavoro" are effected on the best possible terms through special agreements made with the supplying firms. It may also grant subsidies and give prizes to the best cultivators. On the other hand, the individual may dispose on his own account of all the produce apart from a voluntary contribution to the "Dopolavoro" to which he belongs of part of the net profit. (*Il Dopolavoro*, Rome, 1927, a. V, n° 27).

Facts relating to the Cultivation of Wheat in Italy. — On the occasion of a meeting of the Organising Committee of a First National Wheat Exhibition (*Prima Mostra Nazionale del grano*) it was decided to publish a catalogue of all the varieties of Italian wheat with a collection of all facts

relating to the subject. Questionnaires will be drawn up referring respectively to the (a) area and yield of wheat in every province; (b) the measures adopted in each province; (c) the most important breeds and varieties of wheat at present grown in each province. (*Giornale di Agricoltura delle Domeniche*, a. XXXVII, n. 39. Piacenza 1927).

CONGRESSES AND CONFERENCES.

VIII International Conference of Pure and Applied Chemistry. Warsaw, 4-13 September 1927.

V. International Botanical Congress. — In accordance with the proposal made by the British delegates at the IV International Botanical Congress, held at Ithaca (U. S. A.) in August of last year, it has been decided that the next world botanical meeting shall be held in August 1930 in Cambridge, England. This Conference will include seven sections: Morphology (including anatomy); taxonomy and nomenclature; geographical botany and ecology; palaeobotany; genetics and cytology; physiology; mycology and phytopathology.

For information apply to one or other of the two Secretaries of the British Executive Committee: Mr. F. T. BROOKS, *The Botany School, Cambridge* or Dr. T. F. CHIPP, *Royal Botanic Gardens, Kew, England*

International Congress of Viticulture and the Science of Vine growing. Conegliano, Italy, 28-29 May 1927. — Held on the occasion of the five hundredth anniversary of the "Scuola enologica" of Conegliano. The principal subject discussed was that of direct producing hybrids, and reports were presented by R. ZWEIFELT of the School of Klosterneuburg (Austria); FAES, Director of the Experimental Vine-growing Station of Lausanne MACLET-BOTTON, French nurseryman, TOPI, of Siena; PIROVANO, of Belgirate; TEDESCHINI, of Asti; C. DAIMASSO, Director of the Viticultural Station of Conegliano and others

The following viticultural questions were also dealt with: — Viticultural re-constitution in Central Europe by A. TELEKI (Hungary); The weakening of American vines in Venetia, by I. CATONI; Commercial propaganda for wine, by H. BOECK and I. BIONDI; — The necessity of an international agreement for methods of analysis, by VANNI, VANNÉ and MARESCALCHI; — The complete utilisation of the grape in the wine-making industry, by MONTI.

Sugar Conference in Cuba. -- According to information supplied by the Cuban Embassy at Washington to the editor of the *Bulletin of the Pan-American Union* (July 1927), the National Association of Sugar Technologists at a meeting held recently at Havana to convoke for next December a convention of sugar planters preliminary to an international convention to discuss measures for handling the problems of the world sugar industry. The conference will be divided into three sections, namely agricultural, mechanical and chemical.

Congress on Synthetic Nitrogenous Fertilizers. Montpellier, France, June 1927. — Communications were read from COCHET, on cyanamide and urea ; PÉIRLOU, on the manufacture of synthetic ammonia, nitrate of calcium and sulphate of ammonia ; COUTURIER, on the position of the nitrogen industry in France ; WINOGRADSKI, on the fixation of free nitrogen by microbes in the soil. HAUMONT dealt with the important question of the economy of the potash basin of Alsace, LÉVY described the results obtained in France from the respective uses of simple and compound fertilizers and lastly LAGATU of the School of Agriculture at Montpellier spoke on modern viticulture and on the yields which are obtained from it according to the various methods of manuring.

Congress of Viticulture. Montpellier, France, first ten days of June 1927. — Proceedings began with a discussion on table grapes and communications on the subject were made by TACUSSEL, President of the " Office de Vaucluse ", LOUBET, Inspector of the P. L. M. Company and VIRES, Professor of the Medical Faculty of Montpellier.

HUGUES, Director of the local wine-making Station described methods of utilization of grapes not subjected to fermentation ; CARCASSONNE dealt with liqueur wines ; RAVEL and POMIER-LAYRARGUES discussed co-operation. SEMICEHON dealt especially with the by-products of the vine for the manufacture of fertilizers and tartar ; PASTRE dealt with the question of the export of wines in common use.

The Congress approved the following resolutions :

a) that the Government should use every endeavour to conclude commercial treaties between France and the neighbouring nations which will allow all products of French agriculture to benefit by the tariff of the most favoured nation ;

b) that the Commissions charged with the duty of preparing and discussing commercial treaties should include among their members a sufficient number of representatives of agriculture ;

c) that these members shall be exclusively nominated by the Chamber of Agriculture and by Agricultural Societies.

The River Po Congress. Piacenza, 1927. — A number of reports have been presented to this Congress which are of considerable importance from the point of view of applied hydraulics and in connection with the agricultural problems of the valley of the Po. Among the most important of these are : Reafforestation in the Po valley (Reporter : Prof. A. SERPIERI) ; — The Apennine catchment basins in the Po valley (Reporter : Ing. G. GENASSINI) ; — Banking of the river Po (Reporter : M. GIANDOTTI) ; — Regulation of the affluents of the Po (Reporter : Ing. BELLINCONI) ; — Mountain catchment basins (Reporters : Ing. V. BAGGI and Ing. G. FANTOLI) ; — The river Po in respect of irrigation (Reporter Ing. R. GRAMIGNA) ; — Regulation of the Po (Reporter : U. CASALICCHIO) ; — Forest economy in the middle and lower Po valley (Reporter : Prof. D. ACERBO).

EXHIBITIONS, FAIRS, COMPETITIONS.

Fisheries Industry Exhibition, Kiel, Germany. — This exhibition was held from the 14-22 of May 1927 on the occasion of the 50th anniversary of the foundation of the Schleswig-Holstein Central Fisheries Industry Association (*Zentral Fischerei Verein für Schleswig Holstein*).

Iberian American Exhibition, Rio de Janeiro, 1928.

The Royal Agricultural Society's Exhibition at Newport, July 1927 and the Exhibit of the Rothamsted Experimental Station of Harpenden. — The exhibit of by the Rothamsted Experiment Station illustrates the whole work of the Station during period from 1843 up to the present day, and shows graphically that the results now obtained experimentally in connection with agriculture greatly exceed in value the kind of experiment carried out twenty years or so ago. The effects of different methods of treatment of soils for various crops are illustrated, as also the recently developed activity of the Bacteriological Section in connection with the growth of lucerne.

Agricultural Exhibition. Leeuwarden, Holland, 5-10 September 1927. — This has been organized for the occasion of the 75 anniversary of the foundation of the Friesian Agricultural Society

International Competition of Reed and Cane Cutting Machines, Paris, 19-26 July 1927. — Promoted by the "Union des Syndicats de l'Étang" For information apply to representative of the Union, 1 rue de Castiglione, Paris

North African Agricultural Competition. Boufarik, Algeria, 14-29 May 1927.

Competition announced by the Italian National Institute for the Scientific Management Organisation of Work. — The executive committee of this body has decided to open a competition on labour saving processes in manufacture and on elimination of unnecessary fatigue. Prices will be awarded to a money value of 50 000 Lire. For information apply to the *Ente Nazionale Italiano per l'organizzazione scientifica del lavoro*, Rome, Piazza Venezia 11

MISCELLANEOUS

World List of Scientific Periodicals. — The Oxford University Press has completed the publication of the World List of Scientific Periodicals. The first part of this undertaking consisted in compiling in alphabetical order a list of all the scientific periodicals of the period 1900-1921; the first volume of this work appeared in 1925. As the list is not yet complete in spite of all the labour devoted to it by Dr POLLARD, at that time Keeper of the printed books

of the British Museum, the titles of another 600 periodicals have been added in a later volume. The preparation of this second volume involved even more labour than that of the first; as for the convenience of the reader the abbreviations have been inserted which it is customary to use in quoting the periodicals. This was done in order to avoid any ambiguity in bibliographical researches and to facilitate them. In this way the abbreviated designations of nearly 25 000 periodicals had been included. In addition, so as also to facilitate the finding of any one of these, 20 stations have been selected, consisting of the more important libraries of Great Britain and Ireland, and each one of these is designated by a symbol, which is to be found repeated after the title of each periodical. It is however noticeable that a large number of periodicals are not to be found in the United Kingdom, owing to the absence of special libraries and indeed of students of the subjects. (*Science*, vol. LXVI, No. 1700, New York, 1927).

A new Cuban Industry.— According to notice from the Cuban Department of State, sent by the Cuban Embassy in Washington to the *Bulletin of the Pan-American Union* (December 1926), a new industry has been established in Cuba: the manufacture of sugar bags from the fibre of *Malva cubana*. These bags are much more economical than those imported from India, the price of which is from 35 to 38 cents each.

The textile in question was first grown at the Experiment Station of Santiago de las Vegas, the satisfactory results there obtained in the cultivation and handling and weaving of the fibre have led to the building up of this new industry.

A National Arboretum at Washington. — The Congress of the United States has finally approved a law for the institution of a National Arboretum on the banks of the Anacostia River, to the north of Benning Bridge, Colombia district. All State land included in this zone has been transferred for the purpose to the Department of Agriculture and in addition a sum of 300 000 dollars has been set aside for the purchase of lands situated in the District or adjacent to it. (*Science*, Vol. LXVI, No. 1696. New York, 1927).

Specimens of Tropical Timbers for Museums or Research Institutions. — A communication from W. A. ROBERTSON, Conservator of Forests in India, resident at Rangoon, 46 A Dalhousie Street, states that a certain number of duplicate timber specimens from the Burma type collection are available for distribution to research institutions or to museums.

The specimen blocks, which are 6 in. \times 2 in. in size, had been made from trees which have been individually identified botanically, with check identifications at the Forest Research Institute, Dehra Dun and at Kew.

The specimen will be forwarded to the institutions making application and no charge will be made except for packing and freight.

A list of the species available can be obtained from Mr. ROBERTSON. (*Nature*, London 1927, Vol. 120, No. 3009).

JOURNALS AND REVIEWS.

The last issue of the **Svenska Linne-Saliskapets Arshrift** (Year 10, 1927) is completely given up to articles illustrating the life and scientific work of Linnaeus. These articles were presented to the meeting which was held on 23 May 1926 at Smaland by the Swedish Linnaean Society in commemoration of the anniversary of the birth of the great botanist. In one of these articles, Prof. Robert FRIES, chairman of the Society, gives a sketch of the life of Linnaeus, with special reference to the early days passed in his native village of Smaland and to the influence of his interest in botany on the future career of the eminent scientist. Prof. H. O. JUEL and Prof. G. DRAKE contribute some notes of a botanical and pharmaceutical nature on Linnaeus and his efforts to introduce the tea plant from China are mentioned.

NOTES ON THE INTERNATIONAL INSTITUTE OF AGRICULTURE

International Congress for the Betterment of Rural Life (International Country Life Commission). — This Congress took place on 6 August 1927 at East Lansing (*Michigan, U. S. A.*).

The International Institute of Agriculture received a special invitation and was represented by Mr. P. DE VUYST, the Delegate of Belgium on the Permanent Committee of the Institute who is a specialist on the subject, and by Prof. Asher HOBSON, the Delegate of the United States.

Delegates on the Permanent Committee of the Institute. — The Persian Government has appointed as its representative on the Permanent Committee Mr. LAZAR DE POLIAKOFF in place of the MARQUIS DI ROCCAGIOVINE who has resigned.

The Egyptian Government has nominated as its delegate on the Permanent Committee Mr. K. H. RAHIM in place of Mr. H. M. RASMY transferred to other duties.

New adherent States. — The Government of Bolivia has declared its intention to become an adhering member of the international Institute of Agriculture and has nominated Mr. LUIGI SEGARINI as its representative on the Permanent Committee.

The World Agricultural Census of 1930. Towards the end of last July Mr. Leon M. Estabrook, Director of the World Agricultural Census Project, visited Honolulu, Capital of the Hawaiian Islands. The competent authorities showed great interest in the information that Mr. Estabrook supplied with regard to the work of the Institute and promised to carry out an agricultural census in the Hawaiian Islands in 1930, in full cooperation with the Federal authorities of the United States.

A telegram from Tokio dated 29 August notifies the definitive adhesion of Japan to the World Agricultural Census of 1930, following on the understanding reached with Mr. Estabrook as representative of the Institute during the time of his visit to Tokio.

Received by the Library

Ber.=Berlin, Cam.=Cambridge, Gen.=Geneva, Lon.=London, Mad.=Madrid, Mil.=Milan, N.Y.=New York, Par.=Paris, Tor.=Turin, Wash.=Washington.

American co-operation. A collection of papers and discussions comprising the 1st[-2nd] Summer session[s] of the American Institute of co-operation 1925-1926. Wash., American institute of co-operation, 1925-1926. 4v. 23 1/2 cm.

Associazione FRA LE SOCIETÀ ITALIANE PER AZIONI. Sedici anni di attività, 1911-1927. Roma, Castaldi, 1927. 315p., tav., 26cm.

Bologna. FEDERAZIONE PROVINCIALE SINDACATI FASCISTI AGRICOLTORI, 1922-1927. Bologna, Stab. poligrafici riuniti, 1927. 85p., 20 x 27cm.

Bologna. ISTITUTO D'ALLEVAMENTO VEGETALE PER LA CEREALICOLTURA. Un « brido » spontaneo di frumento. Bologna, Società tipografica già compositore 1927. 27p., tav., 27 1/2 cm.

Cillis E. de. La trasformazione agricola culturale del latifondo di Serracapriola. [S. l. n. e.], 1926. 95p., ill., diagr., 28cm.

Compagnie NATIONALE DE MATIÈRES COLORANTES ET MANUFACTURES DE PRODUITS CHIMIQUES DU NORD RÉUNIES. Cent ans d'industrie chimique. Les établissements Kuhlmann, 1825-1925. Par., Établissements Kuhlmann, [1927?] 71p., ill., 28cm.

Convegno DEGLI AGRICOLTORI MERIDIONALI PER L'ORGANIZZAZIONE DEI CONSORZI DI BONIFICA. Il Vº. Convegno degli agricoltori meridionali per l'organizzazione dei consorzi di bonifica. La Bonifica, la colonizzazione e la malaria in Sardegna. Sassari, 14, 15, 16 Novembre 1926. Roma, Riccardo Garroni, 1927. 130p., 28cm.

Cook, O. F. and C. B. DOYLE. Sea-Island and Meade cotton in South-eastern States. Wash. Govt. print. off., 1927. 20p., 23cm. (United States. Department of agriculture, Department circular 414). \$05

Deutsche RAIFFEISENBANK. Fünfzig Jahre Raiffeisen 1877-1927. Neuwied, Deutsche Raiffeisenbank, 1927. 211S., 33 1/2 cm.

Empire COTTON GROWING CORPORATION, Lon. Reports received from experiment stations 1925-26. Lon., The Empire cotton growing corporation, 1927. 234p., 24cm.

Faes, H. et M. STÄHELIN. Les champignons et les insectes ennemis du cerisier. Berne, Imprimerie fédérative, 1927. 27p., ill., pl. 25cm.

Tirage à part de l'Annuaire agricole de la Suisse, 1927. Bibliographie, p. 27.

Fensch, H. L. La comptabilité en Allemagne. Ber., Reichsdruckerei, 1927. 30p., 27cm.

Fensch, H. L. Das landwirtschaftliche Buchführungswesen in Deutschland. Ber., Reichsdruckerei, 1927. 34S., 27cm.

Fontaine, A. French industry during the war. New Haven, Yale univ. press, 1926. 477p., tab., 25cm. (Carnegie endowment for international peace).

Griziotti, B. Politica monetaria e finanziaria internazionale. In collaborazione con Romolo Angelone, Mario Pugliese, Ezio Vanoni. Mil., Istit. edit. scientifico, 1927. 407p., 26cm. (Pavia. Università. Pubblicazioni).

Henderson, H. D. The cotton control board. Oxford, Clarendon Press, 1922, 74p., 25cm. (Carnegie endowment for international peace).

Italia. ISTITUTO CENTRALE DI STATISTICA. Censimento della popolazione del regno d'Italia al 1° dicembre 1921. Roma, Scotti, 1925-1926. 4v., 26cm.

[v. 1 Umbria, v. 4 Sardegna, v. 5 Liguria, v. 6 Lazio].

Kelser, F. Quelles possibilités existent-elles de constater, dans les plus importants pays, l'importance de l'exploitation du bétail et de la production d'origine animale dans leurs relations avec l'alimentation du peuple et l'utilisation de ces éléments dans l'industrie? Ber., Reichsdruckerei, 1927. 27p., 26½cm.

Kelser, F. Welche Möglichkeiten bestehen zur Feststellung der Grösse der Tierhaltung und der tierischen Produktion in den wichtigsten Ländern in ihren Beziehungen zur Volksernährung und zur industriellen Verwertung? Ber., Reichsdruckerei, 1927. 30S., 26½cm.

Kleinhans, R. Der Film und seine Bedeutung für die Landwirtschaft. Ber., Parey, 1925. 46S., 23cm.

Korstian, C. F. and OTHERS. The natural replacement of blight-killed chestnut. Wash., Govt., print. off., 1927. 15p., 23cm. (United States. Department of Agriculture, Miscellaneous circular n°100) \$.05

Latvia. VALSTS BIBLIOTEKA. Latviesu zinātnes un letartura 1923 gads. Rīga, Valsts biblioteka, 1926. 560p., 24½cm. (Latvia. Valsts biblioteka. Bibliografija V.)

« Science et littérature des lettons ».

Leroy, J. H. Le riz à Madagascar et possibilités d'application des méthodes de la riziculture italienne. Par., Emile Larose, 1927. 39p., pl., 24½cm.

« Conférences données aux élèves de l'Institut national d'agronomie coloniale ».

Madras PROVINCIAL, CO-OPERATIVE UNION, LTD. Land mortgage banks:

papers contributed for the consideration of the Committee appointed by the XIV Madras provincial co-operative conference. Royapettah, The Union, 1926. 49p., 24cm.

Marseille. INSTITUT COLONIAL. L'Institut colonial de Marseille, 1906-1926. Marseille, Institut, 1927. 188p., pl., port., 28cm.

Marx, L. La Nouvelle-Calédonie : son climat, sa faune, sa flore, ses ressources naturelles et ses possibilités agricoles. Par., Vigot frères, 1925. 132p., 24cm. (Alfort. Ecole nationale vétérinaire, Publications, année 1925, n°59).

Menozzi, A. L'importazione di fertilizzanti e l'economia nazionale. Roma, Provveditorato generale dello Stato, 1927. 14p., 23½cm.

Metzner, H. Die landwirtschaftliche Selbstversorgung Deutschlands. Ber., Paul Parey, 1926. 150S., 26½cm.

Muesebeck, C. F. W. and M. DOHANIAN. A study in hyperparasitism, with particular reference to the parasites of *Apanteles melanoscelus* (Ratzeburg). Wash., Govt. print. off., 1927. 36p., 23cm. (United States. Department of Agriculture, Department circular n°1487). \$.10

Mullie, G. L'agriculture à la Conférence économique internationale de Genève. (*Revue économique internationale*, Année 19, v. 2, Juin 1927, p.479-85).

Oltre Giuba. COMMISSARIATO GENERALE. Notizie sul territorio di riva destra del Giuba. Roma, Arti grafiche, 1927, 370p., 25½cm.

Palithorp, R. R. and J. W. PARK. Extent and causes of rejections of boxed apples from the State of Washington, seasons 1922 to 1925. Wash., Govt. print. off., 1927. 16p., 23cm. (United States. Department of Agriculture, Department circular 413). \$.05

Palestine ZIONIST EXECUTIVE. DEPARTMENT OF AGRICULTURAL COLONI-

SATION. Census of the agricultural settlements of the Palestine zionist executive established or supported by the Keren hayesod, August 1926. Jerusalem, 1927. 15p., tab., 24 1/2 cm.

Sampson, E. W. The financial side of dairy farming. Parts I-V. Pretoria, Govt. print. Sta. off., 1927. 43p., 24 cm. (Union of South Africa. Department of Agriculture, Bulletin n°12).

Scotland. COMMISSION ON QUESTIONS OF FARM ACCOUNTING AND ECONOMICS. Report of the Committee appointed by the Board of agriculture for Scotland in February, 1925, to examine and report on questions of farm accounting and economics. Edinburgh, H. M. Sta. off., 1926. 34p., 24 1/2 cm.

Sering, M. Internationale Preisbewegung und Lage der Landwirtschaft in den aussertropischen Ländern. Ber., Reichsdruckerei, 1927. 166S., 26 1/2 cm.

Sering, M. International price movements and the condition of agriculture in non-tropical countries. Ber., Reichsdruckerei, 1927. 134p., 26 1/2 cm.

Société des Nations. SECTION ÉCONOMIQUE ET FINANCIÈRE. Annuaire statistique international 1926. Gen., 1927. 184p., 25 cm.

United States. BUREAU OF FOREIGN AND DOMESTIC COMMERCE. Commercial and industrial organizations of the United States. Rev. ed. Wash., Govt. print. off., 1926. 191p., 23 1/2 cm. (Domestic commerce series, n°5)

United States. BUREAU OF FOREIGN AND DOMESTIC COMMERCE. Market research agencies: a guide to publications and activities relating to domestic marketing. Wash., Govt.

print. off., 1926. 81p., 23 1/2 cm. (Domestic commerce series, n°6).

Van Meerten, E. J. A simple and successful septic tank. Pretoria, Govt. print. Sta. off., 1927. 11p., 24 cm. (Union of South Africa. Department of Agriculture, Bulletin n°15).

Viggiani, G. L'avvicendamento delle culture a Perugia dal punto di vista ecologico nei riguardi del rendimento del grano. Napoli, « Aldina », 1927. 22p., 24 1/2 cm.

Estratto dal Bollettino della Società di naturalisti in Napoli, vol. 39, (serie II, vol. 29), anno 41, 1927.

Wheeler, L. A. International trade in dried fruit. Wash., Govt. print. off., 1927. 113p., 23 1/2 cm. (United States. Bureau of foreign and domestic commerce. Trade promotion series, 44).

Wirtschaftsausschuss DER DEUTSCHEN ERZEUGER- UND VERBRAUCHERGENOSSENSCHAFTEN. Ber., Die Geschäftsverbindungen zwischen landwirtschaftlichen Erzeugergenosenschaften und Konsumverein in Deutschland. Ber., Wirtschaftsausschuss, [1927?] 27S., 27 cm.

Wirtschaftsausschuss DER DEUTSCHEN ERZEUGER- UND VERBRAUCHERGENOSSENSCHAFTEN. Ber., Les relations commerciales entre coopératives agricoles de producteurs et unions de consommateurs en Allemagne. Ber., Commission, 1927. 29p., 27 cm.

Worsley, R. E. LE G. A rapid and accurate means of estimating nicotine in tobacco and tobacco extracts. Cairo. Govt. press, 1927, 5p., 27 cm. (Egypt. Ministry of Agriculture. Technical and scientific service, Bulletin n°73).

Direttore responsabile: Prof. CARLO DRAGONI.

Roma — « L'Universale » Tipografia Poliglotta (C. C. I. di Roma, n° 18891)

ECONOMIC AND SOCIAL QUESTIONS

CO-OPERATION AND ASSOCIATION

Cotton Growing and Co-operation in the Central Provinces and Berar (India) in 1925-26.

Report of the Working of the Co-operative Societies in the Central Provinces and Berar from 1 July 1925 to 30 June 1926. Nagpur, 1927. — Department of Land Records, Central Provinces Season and Crop Report of the Central Provinces and Berar for the year 1925-26 Nagpur, 1926 — MUKERJEE, R. Rural Economy of India. London, 1926 — INTERNATIONAL INSTITUTE of AGRICULTURE : The Cotton Growing Countries (2nd Edition) London, 1926. — CANNEY, E. E : Rain Grown Cotton and Climate. British Cotton Industry Research Association, 1924

According to the statistics available for the years 1922-1925, approximately one-fifth of the total yield of cotton in India is grown in the Central Provinces and Berar, where it forms the main commercial crop. The economic value of the crop is however conditioned by the fact that although irrigation works are in progress, and a small percentage of the rice crop, as well as about 10 per. cent. of the wheat is now grown under irrigation, practically all the cotton, covering in Berar 3,507,680 acres and in the Central Provinces 1,877,410 acres in 1925-26, is rain grown. Now the main agricultural drawback of the Central Provinces is the precarious rainfall of these hilly plateaux, which are removed from the full force of either monsoon, while owing to the intersection by ravines of large tracts of the country, much of the water that falls runs to waste.

Rain grown cotton requires a moderate rainfall the average prevailing in this region, *i. e.*, from 28 to 55 inches, being suitable, but the plant can tolerate neither long continued overcast conditions nor excessive sunshine. Plentiful rain with good breaks to allow of the necessary interculturing operations or the later sowings constitute ideal conditions. In 1925-26 the rainfall in eight out of the eighteen districts of the Central Provinces

was lower than the average for each district for the 58 preceding years while in all four districts of Berar it was much below these averages. On the other hand in the remaining ten districts of the Central Provinces the averages were considerably exceeded. In consequence, the Berar crop, especially, suffered almost irreparably from the insufficiency of the rains in June, July and August and the continued dry weather of October, while in certain parts of the Central Provinces the heavy rains of August in particular hampered the all important weeding operations and stunted the growth of the plants. Hence, although the area under cotton was increased in 1925-26 by one per cent. in the Central Provinces and by three per cent. in Berar, the total area under this crop exceeding the average by about 900,000 acres, the actual number of bales was 631,774 as against 1,064,922 of the previous year. The yield of *juar* (sorghum), an important food crop, was also less than the average.

It is not surprising that, although conditions were not unfavourable to the other great export crop, wheat, nor to rice, whether transplanted or broadcast, the situation as regards the cotton crop is reflected in the position of co-operative agricultural credit in these provinces.

In the year under review the loans outstanding against members of village credit societies, of which there were 4,071 as compared with 4,142 in the previous year, increased from Rs. 54,31,479 to Rs. 57,09,314 in the Central Provinces and from Rs. 60,69,396 to Rs. 75,18,953 in Berar. Taking renewals and overdues together, the arrears for the Central Provinces and Berar increased from Rs. 49,70,805 to Rs. 66,69,167, while the percentage to the total outstandings was 65.0 and 39.3 in the Central Provinces and Berar respectively, against 67.6 and 21.4 in the preceding year. The proportion of overdues to the outstandings has thus decreased in the Central Provinces, but it is still very high. The increase in overdues in Berar is the result of poor recovery consequent on the unfavourable cotton crops taken with the fall in the price of cotton. The recovery was actually 27.5 per cent in the Central Provinces and 22.2 per cent. in Berar of the amount due for collection during the year.

It should be said however that the large overdues are traceable to default on the part of societies as well as to the bad crops. In some cases there has been too much reliance on hopes of voluntary repayment in times of good crops, and societies which ought either to have been liquidated or re-organised have been allowed to continue. In consequence steps have been taken to cancel defaulting societies and to expel undesirable elements from the existing societies. Owing to the great demand for money for crop loans, there was, especially in Berar, a rush for registering new societies; all the banks were however warned (by the Registrar) to be cautious about organising fresh societies and financing the existing ones. The authorities have to be satisfied that the members understand the elementary principles of co-operation, are prepared to keep written accounts and apply for loans for current cultivation expenses only. Con-

solidation was in fact the feature of the year's work. Two new Central Banks were opened, making 37 in all. Eleven out of these now have buildings of their own, a fact which adds to their economic value, as well as to their general prestige.

Generally speaking every effort is being made for the education and supervision of societies, and in particular the educational work of the Berar Co-operative Institute promises well. An active propaganda is being carried on by this same Institute for the establishment of Cotton Sale Societies, such as are already doing useful work in Bombay Presidency for protection of the cultivators' interests.

Passing to other non-credit agricultural societies, the Agricultural Unions, of which there are now nine only, one in the Western part of the Central Provinces and eight in Berar, were organised for the purpose of producing and distributing pure seed of Roseum cotton. During 1925-26 the total amount of seed distributed amounted to 40,372 maunds, a decline of about 20,000 maunds as compared with previous years, Roseum seed having proved liable to be attacked by wilt. In consequence the Unions have undertaken other activities such as the introduction of improved breeds of cattle and improved varieties of crops.

As regards agricultural prosperity generally, progress in these provinces is almost certainly affected by the facts of fragmentation of holdings and comparative absence of multiple cropping. Although the actual size of the holding may not be reduced to the degree which obtains in the United Provinces or in Bihar (where it may even be less than one acre), it must be admitted that where other factors such as climate, marketing facilities, etc., are adverse, a much larger holding may be uneconomic, or incapable of supporting a family, and holdings of 10 to 16 acres such as are found in many parts of the Central provinces are for these reasons barely economic. In fact it has been shown by careful examination of the accounts that in a cotton growing village in Berar the profit even on a holding of 20 acres worked by a pair of bullocks is only Rs 20. The owner of such a holding works also in his richer neighbours' fields, and it has been found that 16 out of the 39 members of the village co-operative society are engaged in supplementary occupations, especially carting or work as extra hands. On such holdings the mortgage debt tends to increase, as the interest cannot be regularly paid. Naturally certain subsistence crops are grown, but there is a considerable amount of agricultural idleness, owing to the neglect of multiple cropping. The area cropped more than once in the Central Provinces and Berar in 1925-26 is returned as 2,246,280 acres, out of a total cropped of 25,879,627 acres of irrigated and 1,236,834 of unirrigated land, *i. e.*, about 8 per cent. of the whole area under cultivation is double cropped. It has even been estimated that the cultivators are idle for nearly nine months of the year. In any case it is clear that much remains to be done to encourage the use of catch crops and variety of cropping, as well to stabilise the conditions under which the chief commercial crop, cotton, is grown and marketed.

Agricultural Co-operation in Bombay Presidency (India).

Annual Report on the Working of Co-operative Societies in the Bombay Presidency (including Sind) for twelve months ending March 31, 1926. Bombay, 1927. — Bombay Provincial Co-operative Bank Limited. Report for 1925-26 — MUKERJEE R.: Rural Economy of India. London, 1926.

The 21 Central banks including the Bombay Provincial Co-operative Bank had in 1926 a working capital of 298 lakhs, as compared with 236 lakhs in 1925 and 169 lakhs in 1923. Practically the whole of the additional working capital of the Provincial Co-operative Bank, amounting to 31 lakhs, was absorbed in advances to co operative societies.

The number of agricultural societies, credit and non-credit, in the Presidency have increased from 3,377 in 1926 to 3,888 in 1925, membership has gone up by nearly 30,000 and working capital from 249 lakhs to 314 lakhs. The increase in the number of societies is small as compared with increases in other provinces of India, but on the other hand the average of membership and capital of societies in this Province is higher than elsewhere. Very great caution has been exercised in organising societies in famine or backward tracts, the total amount due from agricultural societies in the previous year was 247 lakhs. Out of this, extension was granted for about 56 lakhs, while 155 lakhs was collected, and the overdues on 31 March 1926 were about 35 lakhs. The percentage of arrears varies from district to district.

Organisation of non-credit co-operative societies is much facilitated in districts where the credit movement has already taken root, and for that reason these societies have developed more freely in the Southern Division of the Presidency, and especially in the Dharwar district where for some time the credit societies have been numerous and well organised. There are now 253 non-credit agricultural societies including implement and machine societies, societies for manure supply, sale of cotton, gul, tobacco, arecanut and other produce, fencing societies, joint cultivation and cattle breeding societies. The formation of separate societies for distribution of seed is not now undertaken, as experience has shown that this work is best done through sale societies, development associations, or through ordinary credit societies.

As regards implement societies, the price of improved ploughs has fallen and cultivators are finding it easier to purchase than to hire through societies. In the Ahmednagar district, however, which has suffered severely from famine, implement hiring societies have done good work. thanks largely to the efforts of the local officers of the Agricultural Department who with the help of the Revenue Department have succeeded in popularising the use of better implements. It has to be remembered that the introduction of improved ploughs in India is not merely a question of overcoming prejudice or custom, but of finding an implement which is really better suited than the traditional wooden plough to the soil conditions of the actual district, and which the cultivator can himself repair and his cattle will not find too heavy to draw.

On the other hand, societies possessing cane-crushers worked by oil-

engines hired them out with great advantage to members. Steps have also been taken to organise power pump societies. Large areas of the Presidency are dependent on well irrigation, and it has been found that a power pumping plant driven by an oil engine can be worked much more economically than a bullock driven lifting plant, and a much larger area can be irrigated round each well. One society owning a power pump has already in 1926 done excellent work, but so far at a loss. Two others are registered, but have not as yet the necessary capital. The main difficulty in the organisation of these societies is reported to be that the owners of the wells take advantage of the financial facilities offered by the Government and are then unwilling to share profits with the other members whose lands may be irrigated from the wells. Schemes are being prepared by the Provincial Co-operative Bank for special facilities for societies in view of purchase of power plant both for irrigation and for other agricultural purposes.

Some admirable work has been done by joint cultivation societies in the Southern Division. In one instance a dam is constructed at an annual cost of Rs. 380, and about 450 acres of land rendered cultivable which otherwise would be flooded by sea-water.

In Sind the members of a group of co-operative societies have been able within the last five years to quadruple their yield in cotton, a result which is largely ascribed to the advantages of co-operative credit over the practice of recourse to the money-lender.

CREDIT

New Regulation of Agricultural Credit in Italy.

Regio decreto-legge 29 luglio 1927, n. 1509 Provvedimenti per l'ordinamento del credito agrario nel Regno *Gazzetta Ufficiale del Regno d'Italia*, No. 197. Rome, 26 August 1927 — Press Communication of the Ministry of National Economy, August 1927 — MARESCALCHI, A. La nuova organizzazione del credito a favore dell'agricoltura La cambiale agraria *L'Italia Vinicola ed Agraria*, No. 35 Casalmonteferrato, 28 August 1927

In completion of the series of financial and economic measures designed to develop and reinvigorate national agriculture, steps have been taken in Italy to consolidate all the legislation on agricultural credit (Decree-Law 29 July 1927). With this object the numerous existing provisions have been replaced by a smaller number of effective measures for the systematic regulation of this difficult matter. A clear distinction is to be made in the first place between credit for working capital and credit for improvements

The following are credit operations for the provision of agricultural working capital. 1. loans for farming lands and for the utilisation, manipulation and transformation of products; 2. loans for purchase of live stock, agricultural machines and implements; 3. advances on pledge of agricultural products deposited in a public or private warehouse; 4. loans in favour of agricultural organisations and associations; either (a) for the purchase of farm requisites for members, or (b) for making advances to members in respect of utilisation, transformation and collective sale of their products.

Loans and advances under heads 1, 2 and 3 may be made to individual organisations and associations which farm land directly under a legal title or under an agreement of any kind

On the other hand credits intended for permanent farm improvement constitute a newer type meeting a much felt need. Such operations include loans for making plantations and changes in the system of cultivation, minor land improvements, construction of farm roads, wells and drinking places, making of walls, hedges and any other means of fencing; building or re-adaptation of rural buildings intended for housing of farm people, stabling of live stock, storing of farm stock and produce and also for the handling of products; construction of works designed to supply the farms with drinking water and irrigation water, or for draining and embankment of lands; applications of electricity to agriculture, treatment of mountain lands, re-afforestation, etc

Loans under this head may be made to private individuals, organisations and associations owning or farming lands under a title which en-

ables them to carry out the operations mentioned, to assume responsibility for the loan and to give the required guarantees. They may also be made to consortia for land improvement or irrigation and similar bodies undertaking the execution of land reclamation and improvement works in the interests of members of a consortium.

In the cases and under the conditions to be later defined, the following operations will be regarded as credit operations for agricultural improvements: loans for the purchase of lands in view the formation of small holdings, enfranchisement of charges on land, the transformation of mortgage debts incurred for permanent land improvements, and the erection of buildings for collective use for storage or distribution of farm requisites or farm products and for stabling of stock.

Liberal terms are allowed in respect of the period for which loans can be granted.

For ordinary loans for farming or utilisation of the products, the date fixed for repayment is the harvest period or the time at which transformation of products is completed. For the purchase of live stock, machines and implements repayment is allowed in not more than five annual instalments, while for advances on pledge of agricultural products the period for repayment is "the time within which the sale may take place without loss to the growers". Loans to agricultural associations for purchase of fertilisers, spraying materials and other farming requisites for the members will be for a period of not more than six months. On expiry these loans may be replaced either partially or wholly by bills of exchange given by the individual members. Lastly improvement loans should be paid off in annual instalments, but may be extended up to thirty years, "dating usually from the year in which the improvements become productive".

All loans for working capital will be effected by discounting agricultural bills of exchange, in the case of loans for improvements an agreement has normally to be signed and a mortgage guarantee, or "some other guarantee considered adequate by the lending institution" has to be provided. When the nature and the method of effecting the improvement admit, these loans too may be made by means of agricultural bills of exchange provided that the work is to be accomplished within five years.

An agricultural bill of exchange is, for all legal purposes, equivalent to an ordinary bill of exchange and should indicate the purpose of the loan, the farm to which it relates, or the place of deposit of the products which are to be utilised, transformed or preserved, and finally the guarantees securing the loan.

The provisions relating to right to levy distress are of special interest. Loans for the ordinary working of farms and for the manipulation of products are subject to the right to levy distress on crops not yet gathered and on those harvested in the year in which repayment is due, as well as on produce derived from the farms which is stored in the dwelling houses and farm outbuildings. This right will be exercised, as regards fertilisers and crops which mature in the second year, both on the crops of the year in question and also on those of the following year. Loans for purchase of

live stock, machinery and implements, are subject to a right to levy distress on live stock, machines and implements respectively.

Appropriate penalties are enforced in the case of persons injuring or removing the commodities subject to such right of distraint as also on any borrower who makes use of the sums obtained for purposes other than those for which the loans were made.

The following institutions are empowered to make loans for providing working capital for agriculture : the agricultural banks, the *Monti frumentari* and the *Monti nummari*, which are about to be transformed into communal banks of agricultural credit ; one for each commune. In addition the following may be empowered to make such loans : the savings banks, the *Monti di piet *, the ordinary credit institutions as well as the institutions of co-operative credit, agricultural consortia, agricultural associations legally constituted and the *Opera Nazionale per i Combattenti*. Loans for agricultural improvements may be made by land credit institutions and by the National Fund for Social Insurance (*Cassa Nazionale per le assicurazioni sociali*). The National Bank of Labour and Co-operation (*Banca Nazionale del Lavoro e della Cooperazione*) is empowered to exercise both forms of credit.

The system of agricultural credit institutions established under special laws is thus re-organised and completed. At the same time the work of co-ordinating local credit facilities for the benefit of agriculture, ensuring their proper direction and adequacy, is placed in the hands of ten regional and interregional institutions. In the formation of these bodies special regard has been had to the differing conditions prevailing in the various agricultural belts in Italy. These institutions are as follows :

1. In the three Venetian provinces, the Agricultural Credit Section of the Federal Credit Institute for the Revival of Venetia, and, for long term credit for agricultural improvements, also the agricultural credit section of the Land Credit Institute for Venetia ;
2. in Lombardy an agricultural credit section to be established in the Savings Bank of the Lombard provinces, affiliation with which will be open to the savings banks and institutions authorised to carry out agricultural credit operations in these provinces ;
3. In Piedmont, a federal agricultural credit institute to be established as between the *Istituto delle opere pie di S. Paolo*, the savings banks and the institutions authorised to carry on agricultural credit operations in Piedmont ;
4. in Liguria, the Agricultural Credit Institute for Liguria ;
5. in Emilia and in Romagna, an agricultural section to be established at the Bologna Savings Bank, affiliation with which will be open to the savings banks and the institutes authorised for agricultural credit in the provinces belonging to Emilia and Romagna ;
6. in Tuscany, a federal agricultural credit institute to be established as between the *Monti dei Paschi* of Siena, the savings banks, the Co-operative Bank of Agricultural Credit with headquarters at Florence, and the institutions authorised to carry on agricultural credit operations in Tuscany ;
7. in the provinces of the Marches, Umbria and Latium, the Agricultural Credit Institute for Central Italy ;
8. in the provinces of the Abruzzi, Molise, Campania, Apulia, Basilicata and Calabria, an agricultural credit section to be established at the Bank of

Naples ; 9. in Sicily, the agricultural credit section of the Bank of Sicily ; 10. in Sardinia, a credit institute for Sardinia.

Briefly stated, the agricultural credit institutes of Liguria, Central Italy and Sardinia are thus being equipped with adequate capital, while the other seven institutes are reinforced by the affiliation of credit and savings institutions which administer the greater part of Italian savings. The organisation, thus planned, is therefore calculated to ensure to agriculture a continuous and considerable flow of funds, which can be concentrated, in the event of special requirements, by rediscounting agricultural bills with earlier maturity at the *Istituto di emissione*. These institutions are expected to devote themselves mainly to credit for working capital, and next to credit for minor improvements. Their funds, if tied up in long term credit operations for land improvements, would inevitably become attenuated and reduced, and it is in order to prevent such a tendency that powers have been given and regulations issued for the establishment of a *Consorzio nazionale per il credito agrario di miglioramento*.

Membership in this organisation is open, not only to the special credit institutions mentioned, but to the State, the Bank of Naples, the Bank of Sicily, the Credit Institute of the Savings Banks, the National Fund for Social Insurance, the National Workers' Accident Insurance Fund (*Cassa Nazionale di Assicurazione per gli Infortuni sul Lavoro*), the National Bank of Labour and Co-operation, as also to the thrift, savings and credit institutes, whether land or ordinary, which obtain authorisation from the Ministry of National Economy. In addition to employing capital the Consortium can operate with funds obtained by issue of interest bearing bonds and debentures.

In this way and in consequence of this reform credit intended to meet the demand of farmers for working capital and minor farm improvements can be directed to any required point by institutions with a more circumscribed sphere of action and accordingly a more direct knowledge of local agricultural needs, while on the other hand credit for land improvements on a large scale will emanate from a single central institution which will be in a position to examine the proposed improvement schemes in relation to the general requirements of Italian agriculture.

The provisions described are accompanied by others, designed to ensure adequate fiscal privileges and generous State subsidies, the intention being to enable the agricultural credit institutions and the National Consortium to operate under conditions specially favourable to agriculturists.

Institution of the Federation of " Pósitos " and Agricultural Colonies in Spain.

Boletín Oficial del Ministerio de Trabajo, Comercio e Industria, Madrid, 24 July 1926

An important circular of the General Inspectorate of the *Pósitos* and Colonization contains regulations dated 23 June 1926, for the constitution of the Federations of the *Pósitos* and Agricultural Colonies within the

Hydrographic Syndical Confederations established by Royal Decree, 5 March 1926 (1).

In accordance with the principle laid down in the Royal Ordinance of 8 April 1926, to the effect that the activities of the various economic institutions concerned should be co-ordinated within each catchment basin, the General Inspectorate of the " Pósitos " and of Colonization is required to institute hydrographic sections for re-population purposes as auxiliaries to agrarian social action, within these Confederations ; and the special internal regulations of the Federations and of the Agricultural Colonies, made in pursuance of the terms of the Circular, authorize the municipal *Pósitos*, the " socialized " *Pósitos*, the agricultural unions, the rural banks and the co-operative societies acting as agricultural credit institutions, to form federations, subject to the control of the General Inspectorate, and functioning as an intermediate body between the Inspectorate and private persons, and also as regional *Pósitos* of the catchment area, subject to the Regulations of 27 April 1923

The capital of each one of these regional *Pósitos* is made up of the initial contributions of the Federations, subsidies supplied by the State, by the Provinces and the Communes, any donations or legacies that may accrue, and the profits on loan transactions, and shall be an inalienable fund for financing the federated *Pósitos* and the individual farmers of the regions, where a municipal or federated *Pósito* does not exist, and for purchasing land for allotments and colonization.

Every Federation shall be governed by its general assembly of constituent bodies under the presidency of the representative of the *Pósito* in the district where it is situated.

The first of these Federations has been established in the basin of the Ebro with particular reference to colonization requirements in connection with which provision is made for the grant of special loans.

The Agricultural Policy of the Argentine National Bank.

La Nación, Year LVIII, Nos 19,987 and 19,995. Buenos Aires, 1 and 9 May 1927.

The Report for 1926 of the Argentine National Bank (*Banco de la Nación Argentina*), in discussing the economic condition of Argentina, refers in particular to the stockbreeding industry, which is suffering from the competition of meat from other countries in the principal markets for Argentine meat, from measures which restrict importation from the Argentine, and from the preference shown in the English market for the meat of smaller animals. The Bank urges that the stockbreeders should organize themselves on more effective and more permanent lines.

In regard to arable farming, the Bank urges that the comparative yield of crops should be studied with a view to reducing the cost of pro-

(1) See *International Review of Agricultural Economics*, No. 3, July-September, 1926.

duction by more intensive cultivation, by the selection of seed, and the improvement of technical methods. It further recommends the formation of producers' co-operative societies for the direct marketing of produce and the creation of an official organisation for the sale of agricultural produce to the consumer.

The total amount of the loans granted in 1926 by the Bank was 1,200,000,000 pesos. To arable farmers direct loans were granted to the amount of 126,000,000 pesos (as compared with 83,000,000 pesos in 1925 and 41,000,000 pesos in 1920) besides loans to the amount of 57,000,000 pesos in the form of discounting bills. Direct loans, including overdrafts, were granted to stockbreeders to the amount of 317,000,000 pesos.

LAND SYSTEMS

Land Settlement in New Zealand.

New Zealand Department of Lands and Survey. Settlement of Crown Lands. Annual Report for 1925-26. Wellington, 1926 — New Zealand Official Year-Book 1927. Wellington — *The Pastoral Review*, Vol. XXXVII, No. 4, p. 354. Melbourne, 11 April 1927.

Part of the work of the New Zealand Department of Lands consists in opening areas suitable for settlement but hitherto unoccupied and in offering these lands to be held for selection under various tenures. In this way a total of 2,197,158 acres in 7,941 holdings have been taken up by settlers during the years 1922-26. The lands now remaining in the hands of the Department for future disposal are of somewhat limited extent and often unattractive, either as being without access, heavily bushed, or with poor soil conditions. The cost of any large scale schemes for improvement of these lands would be very high; on the other hand they form too valuable an asset to be neglected. It is accordingly now proposed, as a means of effecting gradual settlement of these inferior lands, to offer them rent-free, but on condition that certain improvements are carried out within a period not exceeding six years. These improvements are specified as 1. clearing and cultivation; 2. substantial improvements of a permanent nature up to a value of not less than £10 10s. It is understood that permanent grassing of half the area will be effected by the holder, one of the objects in view in all New Zealand settlement being to develop grazing land. The completion of these improvements gives the right to the freehold, and if the holder completes them all in two years, instead of taking six, he is at once fully qualified to become the freeholder.

FARM ECONOMICS

The Profit-earning Capacity of Swiss Agriculture in 1925-26.

Untersuchungen betreffend die Rentabilität der schweizerischen Landwirtschaft im Erntejahr 1925-26 Bericht des schweizerischen Bauernsekretariats an das eidgenössische Volkswirtschafts-Department I Teil *Landwirtschaftliches Jahrbuch der Schweiz* Berne, 1927 Heft 2

Since its foundation in 1898, a guiding principle in the activity of the Swiss Peasants' Secretariate, as the central organ of Swiss agriculture, has been the view that the impartial ascertainment of the organisation of the farm undertaking, the interrelation of the various forms of capital engaged, the extent of the net return, etc., is essential as the basis of any sound agricultural policy. The view is in fact taken that the conduct of agriculture on scientific lines can only be successfully achieved, if the farmer comes to recognise the necessity for the precise economic valuation of all farming processes, and accordingly, regular yearly book-keeping courses have been established since 1901 by the Secretariate, thereby giving farmers the opportunity of learning to think along more definitely economic lines as well as to make their calculations in a more business-like manner. In round numbers 3,000 farmers have attended these classes during the period 1900 to 1926. In the agricultural year 1925-26, ending 28 February, farm accounts were kept on 493 farm undertakings.

A scientific study, following Prof. LAUR's method (1), is prepared from the data obtained from the separate farms, the work being carried out by the special section for collecting returns of profit-capacity (*Abteilung für Rentabilitätserhebungen*) at the Peasants' Secretariate at Brugg. The results are published yearly. Of the data already available for 1925-26, stress may be laid on the following as most important for estimating the position of Swiss agriculture:—

Gross Return. — The gross return, as the total outcome of the agricultural activities of the farmer, is made up of the following items: increased value of implements, etc., increased value content of the soil, the gross returns of the different branches of farming, and interest on the bank account. Table I gives an illustration of the importance of these items, and of their relative proportion to the total gross return.

As regards the first item of the gross return, the increased value of implements, etc., per cultivated hectare, the table shows it to be less in 1925 than in the previous year, except on the farms of 10 to 15 hectares.

(1) LAUR, Prof. Dr. E.: *Grundlagen und Methoden der Bewertung Buchhaltung und Kalkulation in der Landwirtschaft*. Second Edition. Berlin, 1922.

TABLE I — The Gross Return per hectare under Cultivation in the Different Size-groups of Farms

Size groups of farms	Farms of 3-5 ha				Farms of 5-10 ha				Farms of 10-15 ha				Farms of 15-30 ha				Farms of 30-70 ha				Average of accounts closed			
	1924	1925	1926-25	1924	1925	1926-25	1924	1925	1926-25	1924	1925	1926-25	1924	1925	1926-25	1924	1925	1926-25	1924	1925	1926-25	1924	1925	1926-25
Number of farm accounts closed	36	43	615	179	181	2549	102	110	1372	111	108	1308	28	27	389	456	469	6243						
1 Increased value of implements etc	48 05	36 43	41 50	39 34	20 83	32 66	28 69	32 23	27 32	28 04	22 30	27 27	29 15	22 18	24 31	34 27	28 82	30 73						
2 Increased value-content of the soil	3 27	1 76	1 29	2 47	0 77	1 89	1 46	0 61	1 39	1 25	0 49	1 25	5 76	0 94	1 52	2 21	0 77	1 55						
3 Proceeds of sale of cereals, straw, potatoes, root crops, hay and litter	126 94	156 32	128 93	95 78	113 31	118 37	96 81	121 52	107 25	106 19	121 28	100 54	99 62	129 59	110 52	101 24	121 97	114 90						
4 Gross return account in narrower sense (Gross return of fruit and vine growing, cat and horse and pig breeding)	1475 74	1382 19	1115 38	1104 84	1071 50	966 38	1095 54	1041 14	909 64	976 81	927 76	807 45	789 29	759 53	686 77	1081 45	1041 81	917 42						
Including gross return																								
(a) from milk and dairy produce	485 13	514 17	400 20	446 83	461 72	377 90	513 26	512 07	386 19	470 67	464 88	364 60	352 37	348 85	309 44	464 74	472 57	374 87						
(b) herd increase	204 35	243 38	238 77	252 82	241 07	230 39	211 57	203 43	194 98	204 35	183 44	179 39	165 80	163 72	152 54	229 73	215 22	209 73						
(c) pig keeping	209 13	171 79	143 53	101 97	99 06	97 44	135 53	117 55	92 96	97 67	86 80	87 77	125 04	110 27	84 38	119 48	107 89	98 18						
5 Supplementary accounts (turning out of bullocks, rents on land interest on reserve of capital etc)	176 27	181 13	122 52	91 74	64 63	70 38	78 51	70 68	54 24	54 60	58 39	42 62	48 30	41 76	27 09	83 94	85 55	63 17						
6 Bank account	1 65	1 08	1 13	1 54	1 51	1 58	0 95	0 88	1 15	1 23	0 72	1 33	0 54	0 58	0 95	1 20	1 09	1 36						
Total gross return	1833 92	1759 11	1410 75	1335 47	1311 55	1191 26	1301 96	1267 06	1100 99	1168 12	1130 94	989 46	972 68	954 58	851 16	1304 31	1280 07	1129 13						

Taking the average of all farms the decrease in this item is from 34.27 francs in 1924 to 28.82 francs in 1925. The same is true of the increase in the value content of the soil although the sums involved are small. The gross return from the sale of cereals, etc., has increased on the farms of all groups. This increase was especially marked on the large farms (30 to 70 acres). About four-fifths of the total sum realised by these sales represents cereals and potatoes. The gross return from sale and delivery to the farm household itself amounts in francs per hectare to:

	Cereals	Potatoes
1908-13	17	17
1924	45	34
1925	59	36

In respect of both products there was in the year under review a distinct advance on the pre-war position. On the other hand the present cereal crop figures are decidedly below those of the years 1918-21. The main reason for this lies in the fall of cereal prices. In 1920 for example the average price of wheat was 65.26 francs, and in the year under review it was only 44.33 francs the quintal. The average increase in value of this item on all farms amounts to 10.73 francs per hectare. The figures of the gross returns in the narrower sense are lower in 1925 than in 1924. This decline is primarily to be attributed to the failure of the fruit crop and to the fall in the prices of wine, cattle and pigs. These four branches of farming taken together account for a decrease in the gross returns of 57 francs per hectare.

Dairy-farming and bee-keeping, as well as some of the less important branches of farming show an increase in the gross returns in each case. The gross return on milk, for example, advanced 8 francs per hectare. Milk prices, however, average about one centime less than the 1924 prices. The additional gross return is therefore due to the general expansion in milk production. The increase in the gross return taken as a whole is however less than the decline noted in the case of the branches of farming already enumerated. The total gross return per hectare is regularly in inverse proportion to the size of the farm: on the farms of 30 to 70 hectares it amounts to 1,280 francs, and it increases up to 1,760 francs on the smallest farms of 3 to 5 hectares. To quote Prof LAUR, "the higher gross return of the small farms is connected with the rise in values due to improvement in quality of agricultural products brought about by cow keeping: but contributory causes are to be found in a whole series of small peasant farming industries, such as gardening, vine-growing, bee-keeping, poultry-keeping and vegetable growing" (1).

Speaking generally, the gross return in the year under review is lower than in 1924, having fallen by about 24.30 francs per hectare as compared

(1) Der Einfluss des Betriebsgrösse auf den landwirtschaftlichen Rohertrag. *Archiv für exakte Wirtschaftsforschung*, Jena, 1916, Bd 7, 8, 285

with the previous year, taking an average of all farms. Calculated as a percentage of the capital engaged, the figures for the gross return, taking an average of all farms, are as follows: 1914, 14 per cent.; 1923, 19 per cent. 1924, 18 per cent. and 1925, 17 per cent.

The Proportion of Market Production to Consumption on Farm in the Total Gross Return. — A part of the gross return is used to meet the needs of the farming family; the remainder goes to the market. The proportion of the parts used in these ways in the different group of farms in the years 1924 and 1925 is shown in the following table:

	Farms of 3-5 ha		Farms of 5-10 ha		Farms of 10-15 ha		Farms of 15-30 ha		Farms of 30-70 ha		Average	
	Consumed on farm	Marketed	Consumed on farm	Marketed	Consumed on farm	Marketed	Consumed on farm	Marketed	Consumed on farm	Marketed	Consumed on farm	Marketed
1924	30	70	24	76	19	81	16	84	14	86	19	81
1925	33	67	23	77	18	82	16	84	13	87	19	81

Hence the smaller the farm, the larger in proportion is that part of the gross return which is used on the farm and the less important is the share destined for the market. Both consumption on the farm and market production stand at present, expressed in money value per hectare, above the pre-war average. It is impossible to determine whether actual production also shows a similar progressive development.

Production Costs — The farm production costs are distributed under the following main heads: capital written off each year, farm costs, interest on the capital engaged and labour costs. Table II supplies information as to the amount of the different items as also the total amount of production costs per hectare on farms of varying size.

In the first place it appears from this table that the sum of all capital written off in 1925, taking an average of the farm accounts examined, is about 10 francs per hectare higher than in the previous year. This increase in the capital written off is due to the amount written off in respect of cattle, an amount which was 49.33 francs in 1924 and 59.43 francs in 1925. Part of this amount is written off in connection with the fall in price. Capital written off on horses and other farm animals does not as a rule amount to any large sums. Amounts written off on capital represented by buildings varied very little during the last few years. As compared with the pre-war years, an increase is shown which is to be ascribed to the fact that the capital invested in buildings is larger and that improvements of the nature of buildings are being introduced the cost of which has to be rapidly paid off, e. g., electric power installations, hay-elevators, etc. Speaking generally cost of building improvements is less for the larger farms and is in inverse proportion to the area. The amount written off capital sunk in buildings is on an average 1.60 per cent. of this item, and 2.60 per cent. of production costs.

TABLE II. — *Production costs per hectare under Cultivation in the Different Size Groups of Farms (in francs).*

Size-groups	Farms of 3-5 ha				Farms of 5-10 ha				Farms of 10-15 ha				Farms of 15-30 ha				Farms of 30-70 ha and over				Average of all accounts closed	
	1944	1925	1908-25	1944	1925	1908-25	1944	1925	1908-25	1944	1925	1908-25	1944	1925	1908-25	1944	1925	1908-25	1944	1925	1908-25	
Number of farm accounts closed	36	43	615	179	181	2549	102	110	1372	111	108	1308	28	27	389	456	469	6243				
1. Capital written off .	153.03	155.92	126.13	134.70	146.47	97.74	137.18	143.75	96.07	111.73	124.54	84.41	125.43	127.73	80.34	130.54	140.57	96.23				
Including:																						
(a) Capital in buildings	66.13	60.64	47.67	44.60	45.49	31.67	37.64	38.86	26.34	29.19	32.27	21.48	32.40	30.60	17.98	40.25	41.42	29.05				
(b) Capital in machinery	30.33	28.82	20.39	29.52	29.55	19.13	33.01	32.85	19.71	21.97	23.81	15.86	29.31	33.78	16.46	28.52	29.17	18.52				
(c) Capital in live stock	46.60	59.00	47.85	49.15	61.64	37.80	50.29	59.71	38.39	49.10	57.89	36.99	51.48	50.37	35.79	49.33	59.43	38.61				
2. Value content of the soil	1.55	1.48	1.63	1.36	2.26	1.75	1.91	1.33	1.12	1.74	1.12	1.34	0.58	0.67	1.02	1.54	1.62	1.46				
3. Decrease in value of implements, etc.	35.51	39.77	32.24	22.02	23.57	25.74	24.37	21.23	23.73	18.54	24.28	21.23	22.16	15.97	19.34	24.20	24.23	24.54				
4. Farm costs	481.75	432.43	313.87	331.99	323.00	243.53	364.88	361.14	239.58	330.53	319.71	225.00	344.31	333.94	214.55	351.60	341.85	243.87				
Including:																						
(a) Taxes	38.43	23.70	27.44	30.76	20.09	29.93	32.73	19.25	28.17	30.76	17.51	29.52	30.82	12.59	29.17	31.94	19.25					
(b) Insurance	23.21	24.29	14.78	22.47	25.23	13.32	21.04	23.14	12.79	20.15	19.49	12.09	18.91	17.28	10.59	21.43	22.87	12.91				
5. Bank account	1.50	3.42	3.08	1.32	0.66	0.93	1.26	0.76	1.27	0.83	0.54	1.10	0.22	0.34	0.96	1.12	0.89	1.25				
6. Interest charges on capital engaged	495.11	508.41	375.88	351.75	363.89	289.63	331.46	335.81	260.55	295.81	298.89	239.93	264.51	259.87	191.13	336.71	349.60	276.96				
7. Labour cost	925.41	986.34	713.95	679.60	673.89	531.13	564.59	547.33	432.22	470.96	438.99	366.15	388.37	373.51	298.52	604.61	606.09	477.55				
Total production costs	2,075.84	2,127.97	1,566.76	1,522.74	1,533.74	1,199.45	1,425.75	1,411.35	1,063.54	1,230.14	1,228.07	939.16	1,145.58	1,112.03	806.36	1,450.32	1,464.85	1,121.86				

The sums written off in capital represented by machinery amounted on an average to 6.24 per cent. of this capital and to 2 per cent. of the production costs. The present rate of 6.24 per cent. may be regarded as low, as an 8 to 15 per cent. depreciation is usually reckoned on dead stock.

The decrease in the value content of the soil amounts in 1925 to 1.62 francs and averages for the years 1908 to 1925 1.46 francs per hectare. Under gross return (Table I) an increase of 1.55 francs is shown under this head as average for the years 1908-1925. The two figures nearly cancel each other, so that taking all the farms the value content of the soil remains unaltered.

The figures of the year under review for decrease in implements, etc., differ only very little from those of the previous year and of the average of the years 1908 to 1925. In this case also these production costs are counterbalanced by the gross returns, which, taking an average of all farms in 1925, come out at about 4.50 francs more than the amount written off.

As regards the farm costs, purchase of manure, seeds, concentrated feeds, general expenditure, these are always higher on the small farms; the highest figure in 1925 being 432.43 francs for the smallest farms while on the largest farms it was 333 94 francs, nearly one hundred francs less. In comparison with the previous year, a decline in the average farm costs for all farms is to be noted, amounting to 10 francs per hectare. On the other hand as compared with pre-war years there is an increase of more than one hundred per cent in farm costs. The items, taxes and insurance, show an increase in 1925.

It is not yet possible to speak of any real post-war reduction in farm costs.

The charges on the bank account are very small and only amount to one-tenth per cent of the whole production costs. In the course of the year the banking account has assumed more importance in agriculture and even the small farms now have an account at a bank.

Under production costs comes interest reckoned on the capital invested in agriculture. Up to 1919 the rate of interest was fixed at 4 per cent, for 1920 and 1921 at 5 per cent and after that at 4 per cent. A considerable difference will be noted between the results of interest charges for the year 1925 and the 1908-25 average which are respectively 350 francs and 277 francs. This is to some extent due to the disparity in the rate per cent. If a rate of 4 per cent is reckoned for all years, then the charges per hectare become 228 francs, for 1908 to 1923, 257 francs for 1914 to 1919, 299 francs for 1924 and 311 francs for 1925. This makes the difference less striking, but the increase in the interest charges as between pre-war and war time is still very considerable. The reason of this lies in the fact that additional capital has been invested in agriculture in the course of the last few years. The interest charges have increased from 244 francs per hectare, taking the average for 1913-18, up to 302 francs per hectare in 1923-25. This additional 58 francs of interest is distributed among the different classes of capital as follows:

Classes of capital	Increase in francs per ha	Percentage	Percentage of total increase
Capital invested in land	17	20.7	29.3
» improvements	1	100.0	1.7
» buildings	15	20.8	25.9
» crops	4	16.0	6.9
» rent	21	32.8	36.2
Total interest on capital invested	58	23.7	100.0

The interest on capital represented by land and buildings shows an increase of nearly 21 per cent. in each case. The reason for this in the case of land lies in the high prices of land, particularly the purchase of additional parcels, and in the case of buildings in the high cost of building. The additional interest on the capital represented by plantations is 16 per cent. and is mainly due to the extension of fruit farming. The increase of improvement capital is of no great importance. On the other hand interest on capital invested in rent has taken an important place with an advance of 32 per cent. over the pre-war position.

The last and, as regards amount, the most important item of the production costs *viz.*, labour cost, shows, in the case of certain more numerous groups of farms, striking variations in the years 1924 and 1925, which however is merely to be attributed to the composition of the farm groups in those years. Thus the large increase in this item for the small peasant farms, an increase from 925.41 francs to 986.54 francs, is due to the fact that in the year under review the investigation into profit capacity was extended to certain intensively cultivated farms in the Canton of Valais. In comparison with the pre-war figures the expenditure on agricultural labour at the present time is very high. Taking the average for the years 1906-13 as a basis of comparison, the increase in the year under review may be stated as follows:

Farms of	Francs per hectare	Percentage
3 to 5 ha	526	114
5 to 10 "	325	93
10 to 15 "	271	98
15 to 30 "	219	91
over 30 "	186	99
average	291	92

At the present time the labour costs stand at about 92 per cent. higher than the pre-war costs under this head.

The total production costs show in 1925 an increase of 14.53 francs per hectare as compared with the average of 1924. This sum is divided under the separate heads as follows:

	francs per hectare
1. Capital written off	+ 10.03
2. Value content of the soil	+ 0.08
3. Decrease of value of implements, etc.	+ 0.03
4. Farm costs	— 9.75
5. Bank account	— 0.23
6. Interest on capital engaged	+ 12.89
7. Labour costs	+ 1.48
Total production costs	+ 14.53

Items 2, 3, 5 and 7 show scarcely any alteration, the difference only amounting in all to + 1.36 francs. On the other hand the capital written off and the interest on capital together account for an increase of about 22.92 francs per hectare while the farm costs show a decrease of 9.75 francs. The advance in production costs already noted as compared with the previous year is therefore to be attributed mainly to the writing off of capital and to interest charges.

If the production costs of the years 1911-1913 are taken as 100, the costs of succeeding years are as follows:

1914-19	125	1924	171
1919-22	190	1925	172
1923	168		

Over the same periods the price index for agricultural products is as follows, calculated according to the prices of 1911-13:

1914-19	165	1924	162
1920-22	196	1925	159
1923	152		

The relation between the index for production costs and that of market prices for agricultural products has become less favourable in the year under review by about 13 points. In comparison with the prices of the year 1911-1913, taken as absolute pre-war prices, the relative index figure has fallen three points in the last two years. This decline is the more remarkable, as imported raw materials have risen in price.

The farm expenditure, *i. e.*, the production costs a part from the interest charges on the capital engaged in the farming, shows the following variations (francs):

	3-5 ha	5-10 ha	10-15 ha	15-30 ha	over 30 ha	Average
1901-25	1,038	784	683	605	522	732
1924	1,617	1,171	1,094	934	881	1,113
1925	1,620	1,170	1,026	929	852	1,115

As the farms diminish in size, the farming expenditure is higher per hectare. On the average the difference is only about 2 francs as compared with the previous year, and taking the size groups separately there are no very noticeable differences as between 1924 and 1925.

Net Return — What was the effect of all these processes in agriculture on the economic results of farming in the accounting year 1925-26?

The interest on invested capital, the net return, which represents the difference between the farming expenditure and the gross return, amounted per hectare under cultivation to the following sums, in the various size groups of farms (in francs)

Year	3-5 ha	5-10 ha	10-15 ha	15-30 ha	over 30 ha	Average
1901-25	202	255	264	254	212	249
1924	217	164	208	234	92	191
1925	140	142	102	202	102	165

With the exception of the highest size groups, the net return has everywhere declined, especially in the case of the smallest farms, those from 3 to 5 hectares, where the decline amounts to 77 francs on an average per hectare. The reason lies in the fact that owing to various causes, in particular, a fall in prices, the gross return was reduced, while on the other hand no reduction could be effected in the farming expenditure. In comparison with 1924 the following variations appear in the gross return, farm expenditure and net return per hectare

Size of farms	Gross return	Farm expenditure	Net return
	Francs	Francs	Francs
3-5 ha	— 75	3	— 78
5-10 "	— 23	— 1	— 22
10-15 "	— 35	— 18	— 17
15-30 "	— 37	— 5	— 32
over 30 "	— 18	— 29	11
Average	— 24	2	— 26

The deficiency in the net return was 26 francs per hectare as compared with the previous year and 112 francs per hectare as compared with 1923.

To 100 francs of farm expenditure there corresponded net return as follows (in francs) :

Year	3-5 ha	5-10 ha	10-15 ha	15-30 ha	over 30 ha	Average
1901-25	22	35	42	45	46	37
1924	14	14	19	25	10	17
1925	9	12	18	22	12	15

Before the war on 100 francs farm expenditure there was about 34 francs net return. In the last two years this percentage figure has fallen to 15 and 17 francs. The larger the farm the more favourable is the relation between the farm expenditure and the net return, the small farm is not so much a source of income to the peasant farmer as an occupation.

To maintain a four per cent interest on capital invested while the farm expenditure remained the same, the prices of products would have had to stand about 10 per cent higher. The average price of milk in 1925 was 282 centimes per kg.

On the assumption that all other prices of products had risen in the same proportion, with a four per cent interest it ought to have been 31 centimes the kg. If it is assumed on the contrary that the prices of all products other than milk remain unaltered and that accordingly the whole deficit is to be made up from the higher price of milk, this price would have to be in 1925, so as to cover fully the costs of production :

Assuming the percentage of the gross return from milk to the total gross return to be	Centimes
50 %	37.1
60 %	35.6
70 %	34.6
80 %	33.8
90 %	33.2

Although the question of exact calculation in regard to the production of milk does not arise here, these results furnish interesting data as to the relation of milk prices to production costs in the year under review.

Management Wage. — The management wage of the farmer himself, the *Arbeitsverdienst* (to use Prof. Laur's terminology), which is ascertained

by deducting the interest on capital invested in agriculture from agricultural income, may be stated as follows, in francs per day's work :

Year	3-5 ha	5-10 ha	10-15 ha	15-30 ha	over 30 ha	Average
1906-13	2.17	2.98	3.15	3.27	4.62	3.08
1923	4.24	6.19	7.77	8.52	8.87	7.06
1924	4.91	4.62	4.83	5.71	3.01	4.56
1925	4.17	4.08	4.59	4.16	2.32	3.95

The average management wage drops to 3.95 francs per day's work. As compared with 1923 this decline amounts to 3.11 francs (44.1 per cent.) and with 1924 to 0.61 francs (13.4 per cent.). Taking the average of 1906-13 the management wage with 4 per cent. interest amounted to 3.08 francs, while in 1925 with 4 and a half per cent. interest, it was 3.95 francs. There is thus at present a slight advance on the pre-war management wage. In spite of this the farmer is actually poorer than before, as outgoings for maintenance of the family, food, clothing, etc., are much higher now than before the war.

* * *

The results obtained by the accounts of the 469 farms make possible the following pronouncement on the situation of agriculture in 1925-26. The gross return shows a decline. The production costs have risen and with them also the farm expenditure. The net return is considerably lower than the pre-war average. The management wage and the income are markedly higher than was the case in 1914, but the expenses in connection with the maintenance of the farmer's family have increased to a much greater degree. In spite of the expansion and the more intensive methods of milk production, "the year 1925-26 must be noted as very unfavourable for Swiss agriculture". These are the closing words of this most interesting report, which contains other important information which it is impossible to reproduce here.

The Earnings of Farmers in Iowa (United States).

Wallaces' Farmer, Vol. 52, No. 28. Des Moines, Iowa, 15 July 1927.

During 1926 a group of farmers in Iowa co-operated with the State Agricultural College in keeping complete and detailed records of their whole farm business. The results showed that they made an average profit of \$800 on hogs. In other departments losses occurred and had it not been for the profits made on hogs the farmers would have merely covered operating expenses and interest at 5 per cent on a very conservative valuation of their land.

Records were also kept by this group in 1925, and during the two years they returned an average profit of \$3 per hundred pounds of pork produced, while the average production was over 28,000 pounds of pork per farm each year. It seems to be proved that turning grain into pork was the most profitable enterprise on corn-belt farms in 1925 and 1926, and it is expected that it will have been profitable also in 1927.

On a considerable number of the farms a large pasture acreage is used for cattle. A few of the farmers are primarily feeders of western cattle, but more keep a small herd of cows, part of which are used to raise calves. Only seven out of the twenty-one farmers made a profit on the combined milking and calf-raising enterprise ; in no case was the enterprise very profitable, and several farmers had a loss of \$400 or more. The cattle feeders had an unprofitable season in 1926, though in 1925 this group showed a real profit.

The farmers who co-operate with the State College are men of superior ability farming land of high fertility, and have better farm buildings and equipment than the average. It is estimated that they earn at least 2 per cent. more on their farm investment than the average farmer of their community. It is doubtful, therefore, if Iowa farmers whose chief sources of income were beef cattle and hogs succeeded in obtaining 5 per cent. on the value of their land in 1926, after operating expenses and a labour allowance were deducted.

The records also showed the number of hours of labour the farmers put in on their farm business. It averaged 3,326 hours per man for the year in 1925 and 3,393 hours per man in 1926. If week-days only are counted, the average day's work was 10.3 hours.

MARKETING OF AGRICULTURAL PRODUCE

Forecasting the Price of Hogs in the United States.

HAAS, G. C., and EZEKIEL, Mordecai: Factors affecting the Price of Hogs. United States Department of Agriculture. Department Bulletin No. 1440. Washington, D. C., November 1926.

There are about 5,000,000 farmers in the United States who produce hogs. They use hog prices as an indication when to increase their production and when to decrease it, but they do not all do so in the same way. In this regard, farmers may be grouped roughly into three classes: (1) Those who expand production when prices are favourable and contract when prices are unfavourable; (2) those who look beyond current prices to the future and hence generally do just the reverse; and (3) those who keep prac-

tically uniform production regardless of price. Fuller comprehension of what are the factors affecting hog prices should enable farmers to make a more rational control of their production.

Approximately 70 per cent. of the hogs produced in the United States are slaughtered and converted into meat and meat products by packing establishments. Nearly 1,400 individual establishments were engaged in this business in 1913, but the bulk of the business was done by less than a dozen large corporations. From these plants the meat is distributed to retail dealers. Although a considerable proportion of the hog products are exported, the domestic consumption is by far the largest.

As the packers handle the product from the place where the live pigs are bought in the central markets to where the dressed products are sold to retailers in the city, there are but three points in the whole of the typical marketing process at which ownership in the commodity is transferred and a price is established. The first point is the central market; it is at this stage that the wholesale price of live hogs is really registered, there being, of course, different prices for different lots of hogs, dependent on sex, age, weight, condition, etc. The next point at which a price is registered is ordinarily when the dressed products are sold to the jobber or retailer. Here each individual product is sold as a separate commodity and the prices are recorded as quotations for a considerable variety of products. The prices on these different products do not always move together, but when the prices of the most important products are combined into a single price on the basis of the proportion of the whole carcass which they represent, this composite price varies closely with the wholesale price for hogs. Final transfer of ownership occurs when the retailer sells the product to the house-wife or other person who prepares it for the ultimate consumer.

It is only in large central markets that a general market price obtains. For the analysis of the factors which affect prices over the country as a whole, therefore, the central market price is the most significant. There is little difference between prices at the various large central markets, and most of such differences as there are can be explained by the cost of transportation. Not only do hog prices in the central markets move closely together, but they move closely with prices in foreign markets. When prices for hog products are high in Chicago they are high in Liverpool, and when they are low in Chicago they are low in Liverpool. The price of hogs at Chicago, the largest central hog market in the world, may be taken as an index of conditions throughout the world-wide market.

The hogs which reach the markets during a given day are not all slaughtered at the same time and even after slaughter there is great variation in the length of time before the meat goes into consumption. The adjustment between the uneven seasonal slaughterings and the fairly uniform consumption throughout the year is made by storage and export. Since the men who are buying hogs must consider the probable prices for hogs and hog products for some little time ahead, the number of hogs received at the markets on any given day is not to them the most significant point in the supply situation. During short periods when receipts temporarily fall below the general average the competition to get a share of the business

does, indeed, force prices somewhat above the general trend, but not nearly so much as an equal shortage in supply extending over a considerable period. During the period before the war, a reduction of 10 per cent. in the number of hogs marketed over a six-month period, as compared with the number marketed in other similar periods, had a tendency to raise prices, on the average, about 5 per cent., whereas an equal reduction in the number of hogs marketed during a single month, as compared with other months, tended to raise prices to a much less extent.

The demand for hogs ultimately rests upon how much meat consumers of hog products are willing to buy at the prices asked. When consumers are willing to buy a larger quantity at the same price, or are willing to buy the same quantity as before at a higher price, the effect is speedily felt in the hog market.

The price of hog products rose rather steadily from 1904 to the end of the war period, yet the average per capita consumption of pork and lard remained about the same over the period, though varying somewhat from year to year. Comparing changes in hog prices with the index numbers of prices during the same period, it is found that much of the upward sweep of hog prices from 1904 to 1920 represented merely the lower value of money. This was especially true during the period 1916 to 1920.

In addition to the change in the value of money, however, the rapid growth of the population in the United States, especially in the cities, has tended to increase the demand for hogs. The total population in cities increased more than 75 per cent. between 1900 and 1920. The per capita consumption of hog products, so far as it could be measured, remained about the same. During the pre-war period the price of hogs, even where expressed in dollars of stable purchasing power, showed an upward trend. Since this upward trend in prices did not result in a decrease in per capita consumption, it is evident that forces were at work which made consumers willing to pay more for hog products without reducing the quantity purchased.

Prices of several other farm products were also showing an upward trend, even when expressed in dollars of stable purchasing power. Several of these food products take somewhat the same place in the consumer's diet as do hog products. As the price of the other products rose, consumers turned more to pork products, which tended to raise the price of pork products along with other products. The per capita consumption of beef was tending downward, being in 1913 and 1914 one fifth below what it was in 1907 and 1908. With increasing costs of both meats, consumers apparently preferred to restrict somewhat their consumption of beef and to continue to use the same quantity of pork, even though that involved paying somewhat more for the same quantity of pork per capita.

During the war period the demand situation was dominated by European conditions through the tremendously increased export demand. Following the price decline of 1920 and 1921, prices of all farm products began to work back into a realignment with the prices of other kinds of products. The prices received for hogs from 1921 to 1924 indicate that the demand for hogs is not so strong now as it was at the outbreak of the war.

This decrease in demand may possibly be due in part to a somewhat smaller demand for all meats, as a result of the efforts made during the war to replace meats in the diet by other foods. The general low level of the prices of other staple foods, such as wheat and potatoes, during the period from 1921 to 1923, also may have been responsible indirectly for the weaker demand for hogs. There was some recovery in the demand for hogs and hog products in 1924 and 1925, although not enough to bring demand up to its pre-war trend.

In addition to the factors such as growth of population and changes in dietary habits, which may cause the general level of demand to have a regular upward or downward trend over long periods, there are other influences which cause demand to be stronger at some times and weaker at others than the normal trend would indicate. The demand for pork products for export has been one of the most important of these variable influences.

From 1907 to 1914 there was no perceptible trend in the quantity of hog products exported from the United States, though there were great variations from year to year. During the war period there was a tremendous increase in the volume of exports, but soon after the armistice exports fell back to something like the pre-war level. The actual changes in the strength of the export demand may be ascertained by observing the average relation between prices (in dollars of constant purchasing power) and quantity exported in the pre-war period and adjusting the data to eliminate the effect of the price upon the volume. It is thus seen that export demand is variable and elastic, changing sometimes very rapidly. One reason for the fluctuations in export demand was the change in foreign supply in the number of hogs produced in other countries. Changes in the prices in other countries of products like oleomargarine, which could be substituted for lard or other hog products, also tended to affect the export demand. Changes in the relative prosperity of industrial workers and other pork consumers in Europe probably also affected it.

During the period from 1914 to 1918 the World War sent the export demand to unprecedented heights. The very heavy exports following the deflation period of 1920 were due largely to the exceptionally low hog prices and did not indicate a strong demand. Exports in 1923 of nearly twice the usual pre-war quantity indicated an export demand only about 25 per cent. higher than the pre-war period, when allowance for the prevailing low price was made.

Next to changes in export demand, change in storage stocks is apparently the most important cause of change in the strength of market demand. When storage stocks are large much will be added to current production to give the supply of products available for consumption during the next few months; when stocks are low some of the production of the next few months will be held out of consumption and used to build stocks up to their usual level. For this reason hog slaughterers usually tend to bid somewhat higher for live hogs when the stocks of provisions are low than when they are high.

Variation in the purchasing power of industrial workers in the United

States affects hog prices somewhat more than the average of all wholesale prices, but less than the prices of many more sensitive products. Compared with changes in export demand and in storage stocks, changes in industrial activity had only a relatively small effect upon the demand for hogs.

A number of other foods, such as beef, oleomargarine and vegetable oils, and even butter, compete with hog products and a change in the price of any one of these products will have some effect upon the quantity of pork products bought and hence will affect the demand for hogs. Hog prices are rather sensitive to the price of fat steers, especially at times when steers are low. When fat steer prices are higher than \$7.50 per hundred-weight (in terms of 1923 dollars) further changes had relatively little effect upon hog prices, but when steer prices dropped much below that point, hog prices decreased about 10 cents on the average for each 30 cents decrease in steer prices.

The prices of hogs is, of course, affected by variations in the supply as well as by variations in the demand. Much of the variation in the supply is seasonal. Two thirds of the annual crop of hogs are born in two short periods, from March to May and during August and September. Since most of these pigs are fattened for about the same length of time the monthly receipts at markets naturally reflect the monthly variation in births. The preservation of meat by curing and cold storage has been developed to such an extent that the seasonal variation in consumption is not nearly so great as is the seasonal swing in production. As a result the seasonal variation in the price of hogs is not nearly so large as it would be were there no storage of pork and pork products.

In addition to seasonal variations, however, there are large variations in the total production of hogs from year to year. In the last 20 years the average annual receipts have varied fairly regularly with generally about three years from one high point to the next, though the interval has sometimes been as short as two years and was once as long as five years. These constant changes in the supply of hogs, not only from month to month but from year to year, have been among the most important causes of change in hog prices.

One reason why hog production is erratic is that hogs can be produced so rapidly that the number raised can be changed in a relatively short time. A second reason is that hogs are more dependent upon a single feed-crop than any other class of animals. In the United States, corn (that is, maize, or Indian corn) is the great staple upon which hogs are produced. Corn prices change from year to year, and this variation has made hog production sometimes seem, temporarily, very profitable to farmers and sometimes very unprofitable.

During the period 1896 to 1914, 11.4 bushels of corn were worth as much on the Chicago market, on the average, as were 100 pounds of heavy hogs. When that much corn was worth less than 100 pounds of hogs, hog prices were above average as compared with corn prices; whereas, when that much corn was worth more than 100 pounds of hogs, hog prices were below average, compared with corn prices. Hog production was, however, increasing during this period, so that the average ratio of 1 to 11.4 was

not merely sufficient to maintain constant production, but was also sufficient to maintain the average increase in production for the period.

When hog prices are high relative to corn prices, farmers are encouraged to increase the production of hogs. Some time is required for this increase in production to take place. For this reason it takes about a year to a year and a half for changes in relative prices to have much effect upon the number of hogs sent to market. Unfortunately the tendency of farmers to readjust their production to the price always seems to carry them too far in the other direction. This explains the more or less regular "cycles" which have characterized hog prices ever since records have been kept. Starting with a period of corn and hog prices favourable to hog production, farmers breed more sows and continue to increase their breeding stock so long as the current price relation is favourable, ignoring the fact that by the time the hogs will be ready for the market the relation may have changed. Then when this accumulated increase in breeding finally appears as market receipts, the market for hogs is soon oversupplied, and hog prices become unfavourable. Hog producers begin to contract their breeding. But for some time thereafter the surplus of pigs resulting from the previous heavy breeding continues to reach the market and hold prices low, and farmers continue to reduce breeding herds, in spite of the fact that the reduction in breeding stock already made will reduce the pig crop enough to bring hogs back to a profitable basis.

The basic reason for the continuation of the hog production cycle has been the failure of producers to look ahead. Most of them have acted on the assumption that one year would be followed by another just like it.

The relation of corn prices to hog prices also affects the weight to which hogs are fattened. Just to what weight it pays to feed a hog for a given relation of corn prices to hog prices depends upon the skill of the feeder and the quality of the hog, but it always pays to feed to the heaviest weight when corn is cheapest and to a lighter weight when corn is dearest. The change in the average weight of market hogs ordinarily tends to cause some change in the relative price for hogs of different weights. But this is not usually a very significant factor.

Weather conditions form a relatively minor factor, but they must be taken into account in enumerating causes of changes in hog receipts. Unusually low temperatures in the early spring months, especially when accompanied by frequent changes of temperature and a large number of cloudy or rainy days, tend to result in heavy losses of hogs at farrowing time. Differences in the number of hogs due to weather conditions are responsible for about one-sixth of the variation in the market receipts of hogs.

As there has been a rather definite sequence of events in the hog market, it is possible to pick out certain factors the current values of which will serve to indicate what are most likely to be the conditions in the hog market some months later on.

The general prosperity of consumers, as measured by industrial activity, is one of the factors affecting the demand for hogs. It is possible to forecast changes in industrial activity to some extent from the change

in the price of stocks in the stock market, stocks generally starting to increase in value a few months before the lowest point of a period of depression is passed, and generally beginning to decline in value a few months before the high point of a period of expansion is reached.

Trials of the different available series of data have shown that four series are best suited to use as indicating future developments in regard to the prices of hogs. These are (1) the corn-hog ratio, reflecting conditions most likely to cause farmers to change their breeding plans ; (2) the price of corn, indicating the weight to which hogs are likely to be fattened ; (3) the weight of hogs, indicating the current balance between corn prices, hog prices and breeding animals ; (4) the prices of the stocks of industrial corporations, indicating what the speculative community thinks of the outlook for general business conditions. Combining these four factors into a single index, the authors of the Department of Agriculture Bulletin on " Factors Affecting the Price of Hogs " computed a forecast of hog prices for the period 1903 to 1914. The price estimated from the earlier data came very close to the actual price. It included 88 per cent. of the changes in the monthly averages of the actual prices. This shows that during the pre-war period the monthly average of hog prices could have been forecasted six months in advance with a very high degree of accuracy.

There is a futures market for hog products where various provisions can be bought and sold for delivery at future dates, but it has been found that the " future " prices would not have given nearly as good a forecast of hog prices as when the price was estimated on the basis of the four factors above indicated

Since the World War, the variations in European demand and in other factors have been so great that it has not yet been possible to forecast hog prices with the same exactness that they could have been forecasted under pre-war conditions

There seem to have been rather rapid changes in the consumption habits of American consumers during recent years. Factors which may have been partly responsible for this are (1) changes made in diet during the war period under the influence of widespread publicity to " eat less meat " which may have had a more lasting effect than was intended at the time ; (2) the publicity given to such recent discoveries as vitamins in the field of nutrition ; (3) the extensive advertising to increase the use of dairy products and various fruits ; and (4) the higher wage level of the city population since the war (in terms of real purchasing power) which has furnished the means to sustain a higher standard of living. The demand for pork and its products since the war has been markedly different from what it would have been had it followed the pre-war trend

A new factor has also been introduced in the shape of the " pig survey " of the Bureau of Agricultural Economics. This survey gives an estimate of the size of the " pig crop " twice a year and shows what changes farmers intend to make in their breeding operations. Widespread publicity has been given to the pig-survey figures and this has tended to make the hog market more responsive to future changes in receipts than it has been in the past. The upward price movement in 1924 and the downward move-

ment in 1925 both actually occurred some months earlier than would have been expected if forecasted by the method described.

As soon as the pig survey has been in operation for a period of time long enough to enable a satisfactory measure of the response of the market to this new factor to be obtained, it should again be possible to make a highly accurate forecast of hog prices on a mathematical basis.

Export Control of Fruit and other Perishable Products in the Union of South Africa.

Perishable Products Export Control Act, 1926. *Union Gazette Extraordinary*, Vol. LXIV, No. 1,562. Cape Town, 16 June 1926. — Report of Imperial Economic Committee on Marketing and Preparing for Market of Food-stuffs produced within the Empire. Third Report: Fruit, pp. 26, 117, 123 and 127. London 1926. — South Africa: Organisation of Fruit Export. *The Round Table*, No. 62, London, March 1926. — Fifteenth Yearly Report of the Central Board of the Land and Agricultural Bank of South Africa for the year ended 31 December 1926. Pretoria 1927. — Co-operative Fruit Export. A Statement of Policy *The Farmer's Weekly*, Vol. XXXIII, No. 849, p. 1,405. Bloemfontein, 15 June 1927.

An important extension of the work of the Land and Agricultural Bank of South Africa consists in the assistance given to the new Perishable Products Exports Control Board (appointed by the Act of June 1926) in regard to the export of citrus and deciduous fruit through the South African Fruit Exchange.

Since December 1925 the Fruit Growers' Co-operative Exchange has been re-organised as a Federal body, uniting the somewhat differing interests of the growers of citrus and deciduous fruits, any disputes being referred back to the constituent central societies. The two sections of this body are each represented by one member on the Export Control Board. Under the Act representation of other perishable products is provided for, but so far is extended only to the egg industry, the Board thus consisting of these three members, two nominees of the Minister of Railways and the chairman. As the export of eggs is as yet hardly developed, the number of exporters being only 37, as compared with 988 citrus fruit and 770 deciduous fruit exporters, the attention of the new Board is for the present practically concentrated on the export of fresh fruit. All matters relating to packing, transport to the ports, inspection, rejection and grading, pre-cooling and refrigeration, as well as the final arrangement of the shipping programme, are dealt with by the Board. The headquarters are at Cape Town, and local port committees have been established at Port Elizabeth, Durban and East London. To avoid congestion at the ports, fruit inspections are carried out also at inland centres, particularly to suit the convenience of Transvaal growers.

The work of the Perishable Products Export Control Board as regards reservation of shipping space is necessarily one of difficulty, but it is greatly facilitated by the power of the Land and Agricultural Bank

to act, by the terms of its constitution, as guarantor of contracts made by co-operative societies or companies. In this capacity the bank constantly acts as a check on growers' estimates which for climatic and other reasons are liable to be so inexact as to increase seriously the problems of space reservation. Among the powers of the Export Control Board is that of "equalising" rates of freight payable on perishable produce exported from the Union, a power so far exercised only in respect of citrus and deciduous fruits. In 1926 the equalising rates were 74s. per ton of 40 cubic feet for deciduous fruit, and 65s. for citrus fruit.

Under the terms of its constitution the Land and Agricultural Bank is empowered to make advances for the purpose of assisting a farmer to market his produce, but only through the co-operative society or company of which the farmer is a member, and only for the purposes of packing or providing packing material, paying railway charges, shipping freights, etc. By its powers the Bank is rendering the service, essential to the practical execution of the plan for equalising rates, of paying the rates actually charged by the shipping companies while undertaking to collect against such payment the flat rates from the growers or shippers. In addition, the Bank has since 1 August 1925 established a London Agency which has financed a considerable portion of the fruit shipped from South Africa in respect of freight, port and railway charges and has also arranged and financed purchases of packing material, machinery, etc., required by growers and shippers in the Union. All advances made by the Bank for shipment to Great Britain are however subject to the condition that the fruit is consigned to a representative in London of a South African co-operative organisation, *i. e.*, the South African Fruit Exchange. The Fruit Exchange in London effects consignment to selected salesmen for sale in Great Britain or on the continent of Europe. Primarily through the work of the Bank, the South African grower is thus secured against undue dependence on the overseas salesman, and on the other hand, the salesmen are freed from any necessity of granting credit to the growers and can accordingly devote attention to their proper business of receiving and marketing the fruit. The Fruit Exchange is fully alive to the advantages of this system.

An admirable illustration of the working of the whole system is to be found in the history of the shipment arranged in March 1926 by the Fruit Exchange with the approval of the Board of Control for the transport of surplus deciduous fruit to Europe. Owing to the dislocation of shipping caused by the seamen's strike, it proved impossible for the shipping companies to arrange sailings of vessels with suitable refrigerator space for dates fitting in with the ripening season. In order therefore to transport the surplus fruit for which the regular liners had no space, the Fruit Exchange found it would be necessary to charter a special boat in March and accordingly an Italian boat, the S. S. "Edda", was so chartered at a cost of £18,500. The Land and Agricultural Bank guaranteed the performance by the Exchange of its obligations under the charter, while, as has been said, the approval of the Board of Control was secured for the whole scheme. The "Edda" sailed on 20 March 1926, carrying the re-

cord shipment of 182,525 cases of deciduous fruit. The "equalising" rate of 74s. a ton was charged on fruit, other than pine-apples, on which the rate was 45s. It is of interest to note that if the "equalising" rate had not been in force, shippers by the "Edda" would have been called upon to pay the prohibitive rate of approximately 120s. per ton. As heavy shipments were at the same time being made to London, it was decided to place 25 per cent. of the "Edda" fruit on the continental markets. Prices realised, in spite of the somewhat adverse circumstances necessarily attending a casual shipment, were satisfactory.

During the 1925-26 season, December to May, the total quantity of deciduous fruit, including pine apples, exported was 1,632,283 cases, a slight advance on the preceding season. Growers' estimates for the current 1926-27 season were in excess of estimates for the previous year but owing to continued drought and hot winds in January the crop of stone fruit and grapes in the Western Province (the main source of supply) is likely to fall short.

The citrus season is from May to October, and the total quantity of fruit exported in 1926 was 624,170 cases, a decline of 140,000 cases as compared with 1925, to be ascribed partially to drought conditions.

The value of the citrus export is greater than that of deciduous fruit, the relative importance of the different fruits being roughly indicated in the statement: oranges, 8; pears, 6; grapes, 4; peaches, 2; plums, 1. In view of the great numbers of trees (over 3,500,000) now coming into bearing and of the fact that citrus growing can be carried on in almost every region of the Union, it is considered that this export is capable of further expansion. It is probable that the new scheme under the Agricultural Credits Act (1) for financing crops through local loan companies, or branches of the Bank, will give an immense impetus, *inter alia*, to orchard management on improved lines, which should react favourably on export conditions.

(1) *International Review of Agricultural Economics*, October-December 1926, pp. 552-53.

THE SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL AGRONOMY AND TEMPERATE CLIMATE CROPS

Broadcasting Weather Maps by Radio in the U. S. A.

Maps by Radio. *Monthly Weather Review*, Washington, 1926, Vol. 54, No. 10, pp. 419-420, 2 pl.

Methods for transmitting weather maps by radio have been employed between the Arlington Radio Station and the "Weather Bureau". A reproduction of the weather map transmitted shows that it is quite legible and serviceable. The Jenkins system of transmission is used.

The Water Requirement and Cell-Sap Concentration of Australian Saltbush and Wheat as related to the Salinity of the Soil.

EATON F. M. *American Journal of Botany*, Lancaster Pa. 1927, Vol. XIV No. 4, pp. 212-226, bibl.

By "water requirement" or "transpiration coefficient" of a plant is meant the ratio between the amount of water lost during the whole growth period and the weight of dry matter produced.

The writer planned the experiments here described to bring out such relationships as might exist between the water requirement of the plant and the concentration of the sap, and the extent to which either of these factors was influenced by the salinity of the soil. Two very different test plants were used: the Australian Salt bush (*Atriplex semibaccata*) and wheat (*Triticum vulgare*), variety "Prelude".

The experiments were conducted in greenhouses, following the BRIGGS and SHANTZ water requirement and culture methods. In order to modify the salinity of the soil, sodium chloride was used in the experiments (up to 75 % of the dry weight of the soil).

The experiments included determinations of cell-sap concentration

as shown by the freezing-point depression; soil electrical conductivity; freezing-point depression of soil, coefficients of transpiration in relation to the concentration of cell-sap.

The determinations are shown by a diagram for each experiment-plant.

The results show that the coefficient of transpiration is inversely proportional to the concentration of the expressed cell-sap. The lower transpiration coefficients and the higher cell-sap concentrations were obtained from the most saline soil.

The higher cell-sap concentrations of plants on the more saline soils, were largely attributable to electrolytes.

A marked osmotic gradient was obtained between the sap and the soil solution at the equivalent percentage of moisture.

Temperature near the Surface in Various Kinds of Soils.

JOHNSON N. K. and DAVIES E. L. *Quarterly Journal of the Royal Meteorological Society*, London 1927, Vol 53, No 221, pp 45-49

A study of the temperatures in different soils and at different depths is of importance in agriculture and observations were therefore made under the conditions following.

The experiments were carried out on Salisbury Plain through the year 1925 on six plots of ground each 1 m. square, which were prepared with the following surfaces: (1) tar-macadam — (2) bare earth — (3) grass — (4) sand — (5) rubble — (6) bare clay.

The material constituting the surface was 15 cm. deep and the tops of the surfaces were flush with the adjoining ground.

Maximum and minimum thermometers were inserted in brass tubes 1 cm. in diameter and buried horizontally with their axes 1 cm. below the surface. In addition, a platinum resistance thermometer element was buried at a depth of 1 cm. below the surface and gave a continuous record of the temperature by means of a thread recorder.

The results may be summarized as follows:—

(1) In summer the mean soil maxima are considerably higher than the maximum air temperatures. In June the mean maximum for the tarmac was 108°F., which is 37° F. in excess of the air maximum. In the case of grass-covered ground it was found that the mean maximum for the same month was 85° F. or only 14°F. above the air maximum. The values for all the other types of soil lay intermediately between these.

(2) In mid-winter the mean soil maxima are all practically equal to that of the air (about 45°F.).

(3) The mean minimum soil temperatures throughout the year agree with the minimum air temperatures in the screen. The only exception occurs in the case of the grass covered soil in which the minimum averages about 5°F. higher than the air minimum.

Soil Sterilisation By Heat for Glasshouse Crops.

BEWLEY, W. F. *Journal of the Ministry of Agriculture*, London, 1926, Vol. XXXIII, No. 4, pp. 297-311, illus.

A description of several processes employed in glasshouse cultivation. The process consists in baking the soil in a brick oven at 212°F . for about six hours. After reaching $205\text{--}210^{\circ}\text{F}$ a further period of 60 to 120 minutes is quite sufficient.

Sterilisation is also obtainable by steaming. According to the "Small Grid" method of J. HARNETT of Hoddesdon, which in his hands has proved remarkably successful, one inch iron tubes fitted with perforations at intervals of 3 inches are used. These tubes receive steam from hot water pipes, on which they are inserted at intervals of 10 to 12 inches. This grid is placed on the bottom of a trench 16 to 18 inches deep, into which the soil for sterilisation is introduced. After 15 to 20 minutes the soil become uniformly heated to a temperature of 210 to 212°F .

According to the "Tray" system which has been widely exploited by W. B. RANDALL in the Lea Valley, the steam is introduced beneath shallow inverted trays placed on the soil surface (dimensions 8 by 4 ft.). In this case a temperature of 200° 10 in below the surface is obtained in 20 minutes after passing steam at a boiler pressure of 115 lb., 30 minutes at 90 lb. and 50 minutes at 60 lb. When it has reached 200°F , another 30 minutes steaming should be given in normal soils.

There is a third, the "Spike", system almost similar to the other two: a series of tubes is immersed in the soil to be sterilised, and at the lower extremity tubes are perpendicularly branched off. The result is always to let the steam reach the bottom of the trench containing the soil to be sterilised.

In addition to sterilisation by steaming, chemical methods are also employed. Mr J. HARNETT has conducted careful experiments, and his results have been published in the reports of the Cheshunt Experimental Station.

Comparative trials of the sterilisation by steam and the application of cresylic acid have been thus carried out the soil of a certain number of glasshouses was sterilised by steam to a depth of 18 inches; others were treated with 97 to 99 per cent cresylic acid at the rate of one gallon over 9 sq. yards, and others were treated with certain liquid sterilising agents.

It has been found somewhat difficult to obtain a direct contact between chemical sterilisers and the finest particles of soil. Dilute cresylic acid of strength 1 to 40 (vol.) was watered on to the soil by means of an injector worked by water pressure, the water so used amounting to 89 gallons. The final strength was thus 1 in 129. Eight or more days later the top spit of the soil was turned over with the spade and a second similar acid treatment given.

Tomatoes grown on these sterilised soils showed the following results :

Treatment	Yield in tons per acre	Relative yield
Steam	50.25	180
Cresylic acid	43	154
Other liquid sterilisers	33	114
Control	28	100

Such results should leave no doubts concerning the advantage of steam over chemical agents. The following precautions should be taken in connection with sterilisation :—

Always be guided by a good thermometer, in order to control the temperature when sterilising by steam.

Never place unsterilised soil in contact with sterilised soil and so risk reinfection.

Preparation of the soil is essential to success. Dry, open soils steam better than wet soils

The Composition and Distribution of the Protozoan Fauna of the Soil (*).

SANDON, H (Messrs Oliver and Boyd Edinburgh, 1927, 15/).

This book is based on the examination of the protozoa in a considerable number of soils of widely differing types from all parts of the globe. Taking the author's own observations together with those already published by other observers it appears that some 250 species in all have been recorded from the soil, but many of these occur only rarely and cannot therefore be regarded as true soil forms. Of the remainder a few are not at present known to occur anywhere except in the soil, but the majority are highly adaptable and unspecialised forms which occur also in other habitats, especially in waters rich in organic matter. Most of the coprozoic species have also been found in the soil. Some forms common in these other habitats are, however, absent or very scarce in the soil, and the soil forms may therefore be regarded as composing a fairly well-defined community.

The soil protozoa are world-wide in their distribution, the same species occurring in arctic, tropical, and temperate soils. It has not been found possible to associate characteristic species with any particular geographical area or soil type.

Some of the species found in the soil are known to be capable of living under anaerobic or semi-anaerobic conditions. Very few occur in the

(*) Author's abstract.

sub-soil, the maximum numbers being generally found at a depth of 10 to 12 cms.

The influences affecting the numbers of species found in any soil are rather different for the testaceous rhizopods on the one hand and for the flagellates, amoebae and ciliates on the other. For the latter classes the food supply in the form of bacteria appears to be by far the most important factor, since the conditions most favourable to bacterial development are the ones which give rise to the occurrence of the largest numbers of species of these protozoa. Temperature, moisture, reaction, and soil texture are of little importance, but abundance of organic matter is beneficial, except in the case of peaty soils. The highest numbers are found in arable and garden soils. The testaceous rhizopods show a high positive correlation with the amount of organic matter, and a negative correlation with the pH of the soil. They are very abundant in acid, peaty soils where the bacterial development is poor, and scarce or entirely absent from neutral and alkaline cultivated soils.

Brief descriptions and keys for identification are given for all the protozoa authentically recorded from the soil including several new genera and species. Six plates are added illustrating many of the more important forms.

New Phosphate Deposits in Spain.

The American Fertilizer, Philadelphia, 1927, Vol 66, No 9, p 35

These deposits which were discovered in the northern section of the Sierra in the municipal district of Mula, appear at the surface. They are of sedimentary origin as are those of North Africa. Their tricalcic phosphate content varies from 17-30 %. Their potash content is 5.5 %, nitrogen 0.6 %, vanadium 0.23 % and titanium 0.06 %.

It is calculated that there are more than 50 million tons of workable mineral.

The Minerals of the Dead Sea.

The Chemical Trade Journal and Chemical Engineer London, 1927 Vol LXXX, No 2083, pp 408-409

This study on the salts contained in the Dead Sea, shows that their utilization would provide an important source of potash for agricultural purposes.

Below is given the total content of the Dead Sea in the principal salts —

K ₂ O (expressed as KCl) .	1 300 000 000	tons (of 1016 kg)
Br (expressed as MgBr ₂)	853 000 000	»
NaCl	11 900 000 000	»
Gypsum (CaSO ₄ . 2 H ₂ O)	81 000 000	»
MgCl ₂	22 000 000 000	»

Ammoniacal and Nitric Fertilizers.

DEMOLON, A. A propos des engrais ammoniac-nitriques. *Journal d'Agriculture pratique* Paris, 1927, an 91, Tome 1, n° 8, p. 156-157

The nitrogen being the same in both, the nitrate of ammonia has been shewn distinctly superior to the sulphate, and the nitrate of urea superior to urea alone.

However, trials made by M. PETIT on acid soils prove that nitrate of soda gives better results than ammoniacal salts, unless care is taken to add carbonate of lime to neutralize acidity when the latter are used.

The Problem of Rate of Soil Liming.

SLIPPER, J. A., *Industrial and Engineering Chemistry* Washington, D. C., 1927, vol. 19, No 5, pp 561-564, 9 figs, 2 tables

Seventeen liming experiments on very varied soils in the U.S.A. demonstrate that one light application of lime produces a much higher result per unit of lime than one double the size on plants, alfalfa excepted, on lime poor soils. Similarly the pH reaction is much more affected per unit of lime used by one light application.

The conclusion drawn is that liming should be little and often rather than, as has been the approved custom for centuries, in large quantities at long intervals

Seaweed as Manure.

BRIN, F. Fumure, *Journal d'Agriculture pratique*, Paris, 1926. An. 90, t II, n° 38, p 234-235

A concise description of the collection and utilization of seaweed (*Fucus vesiculosus* and *F. serratus*) by agriculturists of the Ile de Ré, France. The seaweed may either be collected when thrown up by the tide on to the shore, often in piles a metre high, or at low tide it may be cut growing at specially authorized times, e. g., in April for the above island.

The seaweed is put in heaps with alternate layers of farmyard manure, and after several months of fermentation the compost formed is used for manuring winter barley.

These seaweed composts give excellent results on early potatoes, used as a foundation manure in conjunction with complementary minerals and fresh seaweed as a top dressing.

Processes for rendering soluble the Phosphoric Acid in Natural Phosphates by means of Silica.

MAUGE Lucien. *Le Phosphate et les Engrais chimiques*, Paris, 1926. An. 35, No. 145, pp. 325-327.

Reference is made to the various modern processes in the manufacture of fertilizers, especially to the use of gypsum for the treatment of felspar (Radman), and of sulphur, also for felspar (Norwegian Nitrogen Association). A brief description is given of the MESSERSCHMIDT "Rhenania" process for the treatment of low grade phosphate (especially those containing 20 % of $(\text{PO}_4)_2\text{Ca}_3$).

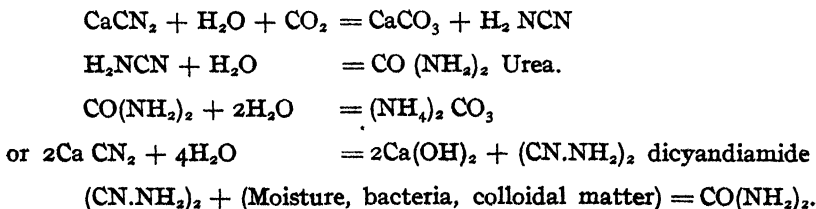
MESSERSCHMIDT heats to a temperature somewhat below 1100° a mixture of potassic rock, minerals containing phosphoric acid, limestone and chalk. This mixture need not be completely fused, as fusion would require such a degree of heat as to risk volatilizing the potassium. Substances are thus produced which contain 90-95 % of their phosphoric acid and nearly the whole of their potassium soluble in 2 % citric acid.

In the manufacture of these new "Rhenania" fertilizers MESSERSCHMIDT has also made use of nitrogenous mixtures (nitrous gas, nitrate of lime, Chile nitrate), and has so obtained a product in which are contained phosphorus, potassium and nitrogen.

The Chemical Change of Cyanamide Nitrogen in the Soil.

EINOSUKE TOMITA, *The Journal of the Society of Chemical Industry of Japan* (Supplemental Binding), Tokyo 1927, Vol 30, No 2, pp 34B and 35B.

CaCN_2 used as a manure ultimately produces ammonium compounds. The chief reactions are probably as follows:—



The author observed that the whole of cyanamide nitrogen formed dicyandiamide on reaction with soil moisture and the degree of decomposition increased with increasing moisture, though the most important factor was the particular character of the treated soil.

He therefore assumes that the agricultural value of CaNH_2 lies in the fact that it is first converted into dicyandiamide as the primary product of nitrogen, which is then transformed into urea by the nitrifying bacteria or colloidal matter of the soil. The author's investigation is supported by LIBERT's explanation (Chem. Ztg. Ref., 1914). The article concludes with graphs and tables showing the result of his work.

Action of Potassic Fertilizers on the Microbial Flora of the Soil.

DEMETER, K. J., Ueber den Einfluss von Kalidüngemitteln auf die Mikroflora des Bodens. *Fortschritte der Landwirtschaft* Vienna and Berlin, 1927, 2. Jahrg, Heft 3.

This study has permitted the counting of microorganisms in samples of soils manured as follows :—

(I) No manure	pH of soil = 6.58
(II) Sulphate of Ammonia and super-phosphate	pH = 5.93
(III) As in (II) + Kainite	pH = 5.67
(IV) As in (II) + 50 % potash salts . . .	pH = 5.45
(V) As in (II) + sulphate of potash . .	pH = 5.49
(VI) As in (II) + chloride of potassium	pH = 5.52

The following table gives some of the results.

	Power of Nitrogen fixation per 10 mg soil in 14 days	Total Micro-organisms per mg	Bacteria per mg				Fungi per mg			
			Total Number	Liquifiers %	Actinomyces %	Spores %	Total Number	Mould Formers %	Yeasts %	Spores %
	mg									
I	12.1	28,680	27,200	28.2	3.2	25.4	1,480	63.5	36.5	54.0
II	21.0	37,200	35,680	31.7	3.0	22.4	1,600	62.5	37.5	33.8
III	10.1	36,900	35,800	27.6	3.2	23.6	1,100	73.0	27.0	6.0
IV	13.0	30,150	29,400	40.8	1.4	28.3	750	93.3	6.7	6.3
V	17.4	34,740	34,140	28.3	3.5	20.3	600	43.4	56.7	10.0
VI	10.5	16,160	15,960	35.7	3.8	25.9	760	73.7	26.3	8.7

It is seen that nitrogen fixation was much greater in the experiment where potassium salts were absent, and that in their presence sulphate of

potash gave the highest figure. Chlorides seem here to exercise a definitely unfavourable influence, which can certainly be attributed to a modification of soil colloids by the alkaline chlorides.

Lucerne Manuring.

HALL, T. H. *Farming in South Africa*, Pretoria, 1926, Vol. 1, No 3, pp. 94-95, 3 ill.

Among various notes on lucerne manuring with the different plant food elements there is an interesting theory on the rôle of sulphur and of phosphates. The writer tried the simultaneous application of sulphur and of natural phosphate at the rate of 300 lbs. of phosphate and 200 lbs. of sulphur per acre. In the light of the good results obtained from this formula he states his opinion that the effect of superphosphate is not due specially to the fact that its phosphate is soluble, but it is also due to the presence of sulphur. He also cites observations made in Oregon where, on soils lacking sulphur, this last element was just as successful on lucerne as superphosphate; and it may be admitted that the effect of superphosphate is due to the sulphur contained in the form of sulphate of lime. The author has started experiments in several places in order to test his theory.

Treatment of Seeds of Leguminous Plants with Sulphuric Acid.

PRILLWITZ Ir. P. M. H. H. Zwavel uurbehandeling van Leguminosenzaden *De Bergcultures*, vol 1, No 28, p 763. Batavia, 1927

MAAS Dr. J G J A. Voorbehandeling van Groenbemesters-zaden. *Ibidem*, p. 766

Both authors give results of experiments in treating seeds of different leguminous plants with the object of obtaining a quicker germination. Mr. PRILLWITZ used in his experiment sulphuric acid, Mr. MAAS used sulphuric acid and hot water.

For the seeds of the following plants a treatment with strong sulphuric acid was proved to be very useful (the first figure after each name means the number of minutes during which the seeds must remain in the acid, according to Mr. MAAS, and the second figure indicates the number of minutes, which Mr. PRILLWITZ recommends): *Acacia oraria* (5) *Acacia villosa* (10-15), *Albizzia falcata* (? ,20), *Calopogonium mucunoides* (10-15,15) *Cassia hirsuta* (40-60), *Cassia Leschenaultiana* (5-15,5) *Centrosema pubescens* (10-15,15), *Centrosema Plumieri* (-,20), *Crotalaria anagyroides* (40-60,40), *Crotalaria usaramoensis* (15-30,20), *Crotalaria striata* (10-15), *Deguelia microphylla* (20), *Desmodium gyroides* (40-60), *Indigofera endecaphylla* (40-60,30), *Indigo ferahirsuta* (30-40), *Leucaena glauca* (10,20), *Mimosa*

invisa (-,20), *Pueraria phaseoloides* (30-40), *Shutteria vestita* (20), *Tephrosia candida* (10-20), *Teph. noctiflora* (10), *T. maxima* (10), *T. toxicaria* (15), *T. villosa* (10), *T. Vogelii* (20,20), *Teramnus labialis* (50-60), *Vigna Hosei* (20,20), *Vigna marina* (10-30), *V. pilosa* (40-60), *V. vexillata* (5-20).

The hot-water treatment was efficient with seeds of the following plants: (the initial temperature of the water is indicated): *Acacia oraria* (60-70°), *Acacia villosa* (80°), *Albizia falcata* (60-70°), *Calopogonium mucunoides* (35-40°), *Leucaena glauca* (60°), *Mimosa invisa* (60-70°), *Pithecolobium Saman* (70°).

Fertility in the Genus *Brassica*.

NELSON, A. *Journal of Genetics*, London 1927, Vol. 18, No. 2, pp. 109-135, 1 plate and 7 text figs, bibliography.

A study on the question of fertility of this genus from the point of view of economic plant breeding and seed production.

The writer describes his experiments on selfing, cross compatibility, parental type work, — chiefly concerned with chances of "rogue" production apart from questions of pollination — and results of various crosses, and discusses and summarizes results.

Thus it seems clear that in all the self-incompatible plants discussed, not of immediate hybrid origin, the cause of the incompatibility is the inability of the pollen tubes to proceed through the stylar tissue and not any inability of the gametes to unite when they do meet.

His view is that, although self-fertility may be conditioned by inheritance, sterility when it occurs may in practice best be controlled by control of the environment rather than by the selection of self-fertile individuals.

The importance of not overlooking "false podding" or fruitfulness accompanying sterility is stressed.

It seems just possible that where this occurs it may be looked upon as a promise of fertility under altered conditions.

"Rogue" production between two commercial crops depends on the amount of pollen of one incident on the aggregate stigmatic area of the other and a "constant" applicable to the relationship under consideration.

This "constant" is the resultant of the self-compatibility of the one crop and the cross compatibility existing between the two.

The value of its two components is shown to depend on and largely to be controlled by environment.

Relationships involving various *Brassicæ* giving promise of valuable recombinations are discussed.

Weakened vegetative vigour following on weak fertility vigour and *vice-versa* are noted and discussed.

Biological Station of Besse, Puy-de-Dôme, France.

MOREAU P. *Revue générale des Sciences*, Paris, 1926. Year 37, No. 21, pp. 613-614.

A description of this experiment station, which is under the direction of the Chair of Botany of the Clermont Faculty and is provided with facilities for research work. Altitude 1,000 metres. Research work regarding wheat and plants suitable for mountainous regions is in progress

An Ecological Study in Utah, U. S. A.

EVANS Alice P. Contributions from the Hull Botanical Laboratory 356. *The Botanical Gazette*, Chicago, 1926. Vol. LXXXII, No. 3, pp. 253-285.

The region described in this paper comprises the greater portion of Salt Lake County, Utah. The information contained in the text, which is profusely illustrated by photographs, may be easily followed with the help of the tables and the geographical and geological maps

The soils of Salt Lake Valley, which originated in a lacustrine deposition, now present great differences. In one part they are very fertile, and in the other alkaline and decidedly infertile; the characteristic vegetation of these two soils is briefly indicated.

The canyons in the neighbourhood of Salt Lake City are described, namely in the first place the City Creek Canyon, to the N. E. of Salt Lake City, which is at a high altitude and consequently possesses special flora, the various species being enumerated by the writer. The vegetation in this canyon has been greatly modified by overgrazing and fire. There is a lake, which is usually dry in summer; the dominant vegetation at that end of the lake, which is surrounded by mountains, is *Salix* and *Mentha*, where there are a certain number of conifers. The aspect is characteristically mountainous.

Reference is also made to other valleys. There are strongly marked differences in the vegetation according to soil conditions, the soil being either crystalline or sedimentary. Among the definite climatic data given in this article the following are noteworthy:—

At the altitude of Salt Lake City (4408 feet) the average rainfall is about 16 in. annually, while at the head of the Big Cottonwood Canyon (8700 feet) it is about 43 inches, which is an increase of about 4 inches per year per 1000 feet.

The temperature at the level of Salt Lake City varies from a summer maximum of about 107° F to winter temperatures of about zero.

The decrease of the air temperature with altitude is about 3.5° F. per 1000 feet.

In her conclusions the writer expresses the opinion that notwithstanding the modifying effects of agriculture, logging operations, and grazing the characteristics of the flora are determined by the natural conditions of soil, altitude, precipitation, temperature, length of growing season, etc.

Importance of Size of Potato "Seed" on the Improvement and Cultivation of Potatoes (1).

KOCNAR Karel. *Annales de l'Académie tchécoslovaque d'agriculture*, Prague 1926, Vol. I, n° 4, p. 533-640, ill. Abstract in French, p. 626-631.

Medium sized potatoes have the largest starch content. No relation can be found between the number of eyes and starch content.

Plants grown from large "seed" grow from the beginning more quickly than those from small seed and appear earlier above ground. These plants from big seed also flower and die down more quickly.

Generally speaking the bigger the seed, the greater the number of potatoes obtained and the bigger the crop.

Where the seed tubers are cut in two, the plants arising from the top part are usually the more productive; they grow more quickly and die down sooner.

Potatoes cut and planted side by side yield a smaller crop than uncut potatoes.

The plants springing from the base of the seed tuber produce tubers, which vary in size with the size of the parent tuber, while this feature is less marked in plants which spring from the top part of the seed.

Large seed of a small yield variety yields a smaller crop than small seed of a large yield variety.

The influence of the size of seed will be more appreciable, the poorer the soil in plant food. If small tubers are planted under bad conditions of soil and manuring they should be planted at closer intervals.

To obtain new seed, it is advisable to use large tubers and to plant them in a well-worked, well-manured soil.

Plants which spring from large tubers shew themselves more capable of resuming growth after, for example, a touch of frost than plants from small tubers.

Continued planting with small tubers enfeebles the stock and this practice favours attacks of disease.

Generally speaking, soil, meteorological conditions, and spacing of seed have more influence on the starch content than the size and starch content of the seed used.

When small sized seed is used it should be planted at shorter intervals

(1) See B. 1925, nos. 803 and 1032 — B. 1916, no. 38 — B. 1917, no. 332 — B. 1920, no. 1096 — B. 1921, nos. 492 and 905 — B. 1922, no. 1162 — R. 1925, no. 49 (Ed.)

along the lines, or two tubers may be planted in each spot and a wider spacing adopted.

The writer advises the selectionist to plant the seed approximately according to size, to divide the first resulting generation into 3 or 4 groups according to the average weight of the original seed and only to compare this generation as within these groups.

From the 3rd vegetative generation he should try out tubers of different sizes on a small scale and in subsequent years on a larger scale on different soils and with different manuring, in order to determine the conditions of spacing, size of seed etc., which will ensure a maximum crop.

Choice of Seed Potatoes.

CHARBONNEL, G *Journal d'Agriculture Pratique* Paris, 1926. An. 90, t II, n° 47, p 410-411

Observations and reflections founded on an experiment carried out in the Haute-Saône Department of France on the expediency of potato selection. Selection carried out by the farmer himself would appear to give better results than buying in fresh "seed". The writer insists on the ease and comparative economy of selection on the spot, comparing it with the expense of buying "seed" and the risks inherent in such purchases, such as the uncertainty as to the real quality of the plants and of their success under the new conditions to which they will be subjected.

Potato Variety Trials in South Africa.

EDELMAN M. *Farming in South Africa*. Pretoria, 1926, vol. I, No. 6, pp. 191-192.

The trials were carried out on a certain number of potato varieties to determine the yield both according to the varieties, and according to the meteorological factors, particularly rainfall.

The following table shows the average yield obtained at the "Cedara" School of Agriculture, during a period of 4 years:—

Varieties	lb per acre
Up-to-date	8,724
Arran Chief	8,425
Kerr's Pink	8,375
Evergood	7,135
Flourball	6,591
Arran Victory	5,546
Arran Comrade	4,910
Tinwald Perfection	4,305

In addition the following varieties which have been recently tested out have given an average yield of marketable potatoes during a period of three years as follows :

Varieties	lb. per acre
Majestic	7,968
Great Scott	7,959
Rhoderick Dhu	6,623
Ally	5,810
Witchill	3,428
Immune Ashleaf	2,382
Dargill Early	2,118

The following table shows the influence of rainfall on the yield of "Up-to-date".

Years	Rainfall during growing season	lb. per acre
1923-24	22.32	5,408
1924-25	29.56	10,944
1925-26	16.75	4,714

There is a remarkable correlation between rainfall and yield, a shortage of rainfall during the growing period resulting in a short yield.

The Weather and the Hay Harvest in New York State.

MATTIA W A, *Monthly Weather Review*, Washington, 1927 Vol 54, No. 11, p 461

In this article which stresses the importance of the fodder crops in New York State, it is stated that the May and June rains and the temperature during these months have greatly affected the hay harvest.

From observations made during the past 30 years, the author has been able to plot a graph of the good (+) or bad (—) results noted in accordance with the conditions of temperature and humidity. The graph shows that the highest hay crops correspond to cool and damp seasons.

The author has succeeded in establishing a formula by which the fodder crop can be calculated with a close degree of approximation as a function of rain and temperature.

Fertilizing Experiments on Fruit Trees in Australia.

QUINN Geo. and SAVAGE C G, Experiments with Deciduous and Citrus-Trees. (The Fourth Report of the State Experiment Orchard, Berri, River Murray). *Journal of the Department of Agriculture of South Australia*. Adelaide, 1926, Vol. XXX, No. 5, pp. 487-499.

From among the numerous experiments described by the writers the following may be mentioned. In a number of trials with peach, apricot, and orange trees the highest yields have been obtained with sulphate of ammonia used at the rate of 168 lbs per acre. Good results were also obtained from peach-trees by the use of bonedust at the rate of 609 lbs. per acre, and from apricots with superphosphate at the rate of 672 lbs. per acre. In one of the experiments on apricot-trees the best result was obtained with sulphate of potash at the rate of 168 lbs. per acre.

The above are some of the facts which may be learnt from the numerous tables given by the writers in their original report, summarizing the results of their experiments.

Rapid Bagging for Securing Choice Fruit.

AUBIN L, *Revue horticole*, Paris, 1927, an 99, n 17, pp 429-432.

The bagging of fruit, to guard it from various parasites, must be done quite early, when the fruit is about the size of a walnut.

The rate of work varies according to the method employed.

1 If straw or raffia is used for tying, a woman can fix 100 bags per hour,

2 if pins are used, 200 bags per hour,

3 if rubber rings, 500

Even though the rubber ring is intrinsically the dearest form of binding it is actually the most economical thanks to the saving in labour.

The rubber ring is first put round the paper bag near the opening. The bag is then placed in position by slipping the opening over the fruit with two hands, and so bagging the fruit to be protected. The bag is then closed by a rubber ring round the stalk and the paper is finally drawn tight where the ring comes, so as to minimize the tension on the ring.

Composition of Raisins from Cyrenaica.

FERRARA, A. Analisi di uve passe della Cirenaica. *L'Agricoltura coloniale*, Florence, 1927, anno XXI, n° 1, p 5-11, 1 fig.

Below are some extracts from chemical analysis tables published in this article for 16 varieties of grapes from Cyrenaica.

Among others a variety, "zagteira nera" which has proved satisfactory in exportation tests has been selected.

The analyses given below are those of grapes converted into raisins according to the Malaga method :—

	Average weight of a grape	Pulp	Pipe	Moisture	Sugar	Acidity in Tartaric Acid
	gm.	%	%			
Zagteira nera . . .	1,736	94.30	5.70	23.68	55.30	0.875
Razaghi.	1.551	95.80	4.20	20.60	60.76	0.951
Baiudi	1.292	95.35	4.65	25.20	48.30	0.896
Turchi rossa. . . .	1.380	91.79	8.21	20.70	42.52	0.841

The original work gives the analyses of 8 varieties made on "Malaga,, raisins and also on "Zibibbo,, raisins. The analyses differ very slightly according to the modes of preparation; the proportion of sugar may however vary up to 3 %, but this is rare and found in one case only, Razaghi, where the "Zibibbo" raisins show 63.80 % of sugar as against 60.78 for the "Malaga" raisins. The acidity is practically identical, the difference going no farther than to a few units in the second decimal place.

TROPICAL AGRICULTURE

Cacao Yeasts.

VON LILIENFELD-TOAL, O. A. Ueber Kakaohefen. Ein Beitrag zur Kenntnis der Biologie der Kakaofermentation. *Beiheft zum Tropenpflanzer* Bd. 24, S. 11-48. Fig. 7.

The opinions of scientists regarding the factors which act during cacao fermentation are still very divergent. LOEW, for instance, is strongly of opinion that in this phase, so important for the production of cocoa, it is mainly a matter of purely chemical (enzymatic) processes; others, on the other hand, especially BEHERENS and SUCHSLAND, insist rather on biological processes. According to the latter, importance should be attached to processes of fermentation, especially alcoholic fermentation, which are noted at the start of the fermentation initiating the complex process of metabolism, and on which it exercises an unfavourable influence. Thus the sugar contained in the pulp of the fruit ceases to ferment because the alcohol produced first kills the germ and consequently also partially the kernel of the cacao itself.

Herr W. BUSSE, some years ago, reinvestigated these questions and made a critical examination of previous experiments; he laid special emphasis on the necessity of discovering the causes of certain partial processes and of investigating their influence. On these occasions BUSSE held that alcoholic fermentation should be accelerated by means of pure yeasts and other ferments when its action was insufficient and acetic fermentation followed, injurious to the raw cocoa placed on the market. This happens in some places of production in West Africa. BUSSE wishes finally to discover the actual excitants of fermentation and their vital conditions. Attempt made up to the present by PREYER, NICHOLLS and HODSON, are inconclusive.

On the initiative of BUSSE, HENNEBERG has experimented with cacao and in the article under review the results of experiments on cacao yeasts, made by his pupil Von LILIENFELD-TOAL, are given. These results were obtained from experiments on cacao kernels from all cacao producing countries. It was possible to extract yeasts from nearly all the samples.

The flora of the yeasts of the different places of production may be divided into two groups —

(1) The species which are always or almost always found on the seeds of cacao and which belong to the normal flora of fermentations. They are:— the alcoholic cacao-yeasts, the cacao *Schizosaccharomyces*, a yeast of the *Anomalus* type and a *Saccharomyces Theobromae*.

(2) The species which are rarely, sometimes accidentally, found on the cacao kernels. These yeasts are of no importance to the completing of fermentation. The result of the experiment was that the flora of the yeasts of all the countries from material which was examined proved almost always the same. An alcoholic yeast which the writer calls "Kakaoweinhefe" (alcoholic cacao yeast) was found without exception on the cacao kernels from all countries and it was very frequently accompanied by a species of cacao *Schizosaccharomyces*.

Further, it was possible to isolate a *Saccharomyces Theobromae* for all the countries and a yeast of the *Anomalous* type. It was never, however, possible to find a yeast of the *Apiculatus* type, probably because this very sensitive yeast does not stand the process of drying the kernels.

For the fermentation of cacao, only the alcoholic cacao yeasts *Saccharomyces ellipsirdeus* var *Tropicus* (v. Lal. and Bbg.) and *Schizosaccharomyces Busseri* are considered. The former is a race of the same species as German indigenous wine yeasts as acclimatized to the conditions of life in the tropics. Thus the cosmopolitan nature of the alcoholic yeasts becomes apparent. The cacao *Schizosaccharomyces*, like all the other *Schizosaccharomyces*, does not exist in temperate zones, but is scattered in the tropical zone all over the world. The other species and races described cannot be considered in a short article like the present.

In this study much space is devoted to descriptions of the new yeasts, their physiological qualities, their faculty of fermentation, etc.

For the practice of fermentation of cacao, the fact that the *Schizosaccharomyces* offer a much more vigorous resistance to other organisms and to the products of their transformation than the alcoholic yeasts, is important. In this way therefore, *Schizosaccharomyces* and others possess in their resistance to acetic acid a valuable quality which is lacking in the alcoholic yeasts. The experiments were made in W. HENNEBERG's laboratory at the same time as practical trials by F. ZELLER in the Cameroons.

Correlations of Seed, Fibre and Boll Characters in Cotton.

KEARNEY Thomas H. *Journal of Agricultural Research*, Washington, D. C., 1926, Vol. 33, No. 8, pp. 781-796.

The information supplied by the author in regard to the correlations existing among the characters of the bolls, seeds and fibre of cotton is the result of work done on the United States field station, Sacaton, Arizona, chiefly on varieties of the Egyptian type and also on a second generation population consisting of 180 plants of an Upland-Egyptian hybrid. An attempt was made to ascertain the physical and physiological interrelations of characters that are of practical importance in cotton breeding.

Correlation coefficients were obtained in 1925 on 250 bolls for certain characters (length, diameter, and index) and on 224 for the other characters, the bolls being taken from 50 plants of Pima Egyptian cotton. Com-

putations were made of all possible correlations of the characters: seedcotton weight per boll, fibre weight per boll, lint percentage (1), lint index (2), number of seeds per boll, mean weight of the individual seeds (3), boll length, boll diameter, and boll index (4), in all 36 pairs of characters.

Correlations of eight pairs of characters were also determined in 1925 on 25 samples of Pima cotton from as many fields in the Salt River Valley, Arizona, each sample comprising 100 bolls.

For three of the eight pairs of characters the coefficients differ markedly although the significance of the differences is doubtful. The comparison shows clearly, however, the danger of generalising as to the correlation of characters on the basis of a coefficient determined on a single population and under one set of environmental conditions.

Evidence as to the occurrence of linkage, afforded by the correlations of characters in a second-generation population of an Upland-Egyptian hybrid, is discussed in the concluding section. Coefficients higher than 0.25 were obtained in the hybrid only in cases where the correlation is obviously or very probably of a physical or physiological nature, or in other words, due to the mathematical relationship of the characters or to a like effect of environmental upon otherwise independent characters.

Among the characters considered in this paper, the only significant correlation found by the writer, which appears to be neither physical nor physiological, is the negative correlation between fibre length and fibre colour in the Upland-Egyptian hybrid, which gave a coefficient of -0.230 ± 0.048 . In this case the correlation is disherent, the Upland parent having had shorter and lighter coloured fibre than the Egyptian parent, whereas the hybrid shows a tendency for longer fibre to be associated with lighter-coloured fibre and vice-versa. Such a correlation, if really genetic, may be interpreted only on the unproved assumption that crossing over in excess of 50 % has taken place.

An apparently well-substantiated case of linkage between sparseness of the fibre and absence of fuzz on the seeds and vice-versa, has been reported by THADANI (Thadani, K. I. 1923. Linkage relations in the cotton plant. *Agricultural Journal of India*, No. 18: pp. 572-579, illus.).

Cotton Production in New Caledonia.

ETESSE, M. La production du coton en Nouvelle-Calédonie. *Coton et Culture Cotonnière*, Paris, 1927, v. II, n° 1, p. 1.

This Colony, thanks to its climate and soil, is in a position to produce a cotton equal to the best Egyptian varieties. With the exception of the

- (1) Weight of fibre as percentage of weight of seed cotton.
- (2) Weight of fibre $\times 100$ divided by the number of seeds.
- (3) Weight of seeds divided by the number of seeds.
- (4) Diameter as percentage of length.

bottoms of certain valleys with compact clay soil, all the other agricultural land is suitable for its growth.

The species at present grown appears to be a descendant, more or less crossed, of species imported, apparently at the time of the American war of secession. When in 1906 the growth of cotton was encouraged, it existed scattered over shrubby land with all the characters of *Gossypium Peruvianum*, hardy and productive this was the Caledonian cotton. To protect it, the importation of seed of any other species was prohibited, and now this cotton, which according to some is descended from *G. Peruvianum* and according to others from *G. Brasiliense*, is the only cotton grown in the island it is a perennial plant, very hardy, of considerable growth, which can give crops for several years; moreover during the harvest this species has the advantage of not letting the lint drop under the action of winds which blow daily over the Island. The seeds are agglomerated and resist the wind owing to their adherence to the base of the capsule. The fibres of this cotton are of excellent quality, up to 40 mm long, very strong and woolly to the touch. It is at a premium on the markets of Havre and Liverpool, where it is considered capable of replacing Egyptian cotton.

It is admitted by all writers that Caledonian cotton yields 300 to 400 kg of lint per hectare, which corresponds to a gross production of 1500 kg. with a yield of 27 % of lint.

There is no doubt that with a little more care in cultivation the yield could be still further increased.

The Brazil Nut.

OGDEN PIERROT, A. La Noix du Brésil *Bulletin des Matières Grasses de l'Institut Colonial de Marseille*, Marseilles, 1927, n° 3-4, p. 81.

The Brazil nut trade, which up to the last few years was of small importance, has recently developed to the point of eclipsing all other trades of the Amazon valley with the sole exception of rubber. The exports of the nuts at present exceed 300 000 tons a year.

The tree which produces this nut, called in its native country "Castanha do Para", is *Bertholletia excelsa* Numb and Poupl. of the family of the Myrtaceae.

This tree is one of the largest in the South American forests and even reaches a height of about 45 m. with a diameter at the base of about 1.80. The tree begins bearing in the 8th year and enters into full production after 12 years. The fruit, which is similar to that of the cocoa nut palm, is from 7.5 to 15 cm in diameter with a very hard shell containing

from 12 to 22 nuts adherent to each other and with a large oleaginous kernel. A tree may yield from 500 to 1000 lbs. of nuts. Since 1914 this fruit has become the second crop of the Amazon. The region in which this species is found includes all the lower basin of the Amazon and that part of the basin of the Upper Amazon situated at about 13° of South latitude in the eastern part of the territory of Acre. In the vast region in which the nut is found several different species occur which are classified under three categories, large, medium and small, in the markets of Para and Manaos.

In the State of Para, the three districts of Obidos, Alemquer and Almeirim produce 60 % of the nuts. In the State of Amazon the greater part come from the regions of Rio Negro, Solimoes, Purus, Madeira and Manés.

The United States absorb the greater part of the quantity exported. In Europe the chief importing country is England, next in order come France, Germany, Italy and Belgium.

Most of the crop is harvested from January to March, but the period of gathering lasts from November to June

The manual labour for the harvest on behalf of the owner of the concession is furnished by workmen paid according to the product sent in after washing. The average quantity which a man can collect daily is 1 ½ "barricas" and during the whole season does not exceed 70 "barricas", with an average however of 20. The nuts collected pass through several hands before arriving at the shipping place.

Transport by sea is generally made in bulk in ventilated holds to prevent fermentation. Sometimes the nuts are also exported in boxes of 150 lbs. and this facilitates shipping as regards quality.

The quantities exported are subject to a tax due to the State and a tax due to the "Municipios" from which they come. The State of Para collects 20 % of the value based on the official rate which changes every week. The official unit is the hectolitre and the municipal tax is generally 5 %. As by-product use is made of the large external involucre of the fruit to furnish a kind of tow for caulking ships. The oil has various uses, for lighting, in pharmacy, etc. The timber of the tree is used in naval construction. The principal product, as is well known, is the kernel, largely used as a dry dessert fruit, for confectionery and for the extraction of the above mentioned oil.

In view of the great consumption at present of Brazil nuts it may be expected that the present natural production of Brazil will soon be insufficient to meet the demand, and the further planting of these trees in the country would seem desirable, but the large inaccessible areas which still remain to be exploited have attracted the attention of Amazon owners and thus the idea of planting does not gain ground.

Experiments on Kokerit Fruits.

Imperial Institute. Bulletin of the Imperial Institute, London, 1927, Vol. XXV, No. 1. pp. 1-6.

Some specimens of kokerit fruits from British Guiana were recently submitted to the Royal Botanic Gardens, Kew, for identification. The opinion given was that these fruits appear to be identical with those of a species of palm grown in the Gardens under the name of *Maximiliana regia*, but that further investigation is necessary to render the identity certain.

The fruits received at the Imperial Institute in 1927 consisted of pericarp, nut and kernels. They were dark-brown in colour, pointed at the apex and rounded at the base, 2 to 2 $\frac{1}{4}$ inches long and $\frac{3}{4}$ to one inch in diameter; the pericarp is tough and fibrous externally, but the inner portion is soft and oily. The kernel is of the same consistency as that of palm kernels; it is long, narrow, oval and flattened; it represents 15.3 % of the weight of the fruit.

The pericarp, treated with light petroleum, yielded 10.1 % of oil, corresponding to a yield of 12.6 % from the moisture free material and to 1.8 % from the whole fruits. The oil thus obtained is of a dark red-dish-orange and on standing deposits a large quantity of stearins.

The oil was examined with the following results: Specific gravity at 100/15°C. 0.8590; refractive index at 40°C. 1.4575; solidifying point of fatty acids, 23.8°C., acid value, 70.1; saponification value, 206.9; iodine value (Hubl. 17 hrs.) 56.1, unsaponifiable matter 2.3 %; soluble volatile acids 0.55 (open tube method), insoluble volatile acids 2.65.

The kernels contained 18.7 % of moisture, and on extraction with petroleum yielded 54.6 % of oil, corresponding to 8.4 % from the whole fruits. This kernel oil was examined with the following results: specific gravity at 100/15°C. 0.8673; melting point 28.2°C.; refractive index at 40°C. 1.450; solidifying point of fatty acids 25.5°C.; acid value 2.6; saponification value 248.5; iodine value % 10.5; unsaponifiable matter % 0.3; soluble volatile acids 6.5; insoluble volatile acids 11.6 (the last two express the cc. of N/10 KOH required to neutralize the acids from 5 gm. of fat).

Kokerit kernel meal has little taste or smell and contains about 7 % of fats, 15 to 16 % of crude proteins and 48.6 to 52.2 % of carbohydrates; it is free from alkaloids and from cyanogenetic glucosides.

Some difficulty is experienced in separating the kernels whole from the nut, but the operation can be facilitated by submitting the nuts to steam heat and then cracking them in a suitable machine.

The Cultivation of Guaraná.

A cultura do guaraná. *Boletim do Ministerio da Agricultura, Industria e Commercio, Rio de Janeiro, 1927, a. XVI, v. 1, nº 1, p. 57.*

This is one of the valuable Sapindaceae, the *Paullinia Cupana* H. B. and K. (= *P. sorbilis* Mart.) which is grown specially in the State of

Amazonas (Brazil) for the production of seeds which are highly valued in medicine for their tonic properties. The yearly production amounts to 100 tons.

The seeds have the following percentage composition :—

Caffein	4.288	Pyroguaranic acid . . .	2.750
Thick oil, yellow	2.950	Albuminoid matter . . .	2.750
Red resin	7 800	Starch	9.350
Red colouring matter . . .	1.520	Glucose	0.777
Amorphous colouring matter	0 050	Malic acid, mucilage and dextrin	7.407
Saponin	0 060	Plant fibre	49.125
Guaraná tannic acid . .	5.902	Water	7.650

Guaraná is a native plant of the above region and in its habit stands between a creeper and a tree. The seeds germinate 5 months after sowing, but may lose their power of germinating within 8 days, if not kept in a moist place.

The Amazonas Government prohibits the exportation of these seeds unless they are first dried so as to lose their power of germination.

A "guaranazeiro" or plantation of guaraná starts producing after 3 years; flowering takes place in July and ripening in October or November.

The fruits are placed in water to free the seeds from their coats, and, after thorough cleansing, these are dried in an oven at a moderate heat. The black skin is then removed and they are pounded into a paste from which are made cylindrical blocks of 15-20 cm. long \times 3 cm. broad, which before despatch are smoked for 30 days in a special compartment. Commercially two qualities of guaraná are known: "bom" and "poca". Both are of the same composition, but "poca" deteriorates after a certain time.

Sump. (*Balanitis aegytiaca* Del.).

AMMANN P. Le Sump *Bulletin mens de l'Agence économique de l'Afrique occidentale française*, Paris, 1927, a. 8^e, n^o 86, p 73.

The common name of "Sump" is given to this tree of Senegal, where it is very widely spread, though found also in some semi-desert zones of tropical Africa, in India and in Burma. It is always found in soils not subject to flooding where it forms stands consisting of 30 to 50 trees per hectare. It is very hardy and has no difficulty in sending out shoots from the main stem. Its branches are green and covered with long green thorns.

The wood is much sought after, as it provides an almost smokeless fuel, and it is also used for making various utensils.

In Senegal the fruit matures in September-October, but harvesting is also done later. These fruits, which resemble immature dates, are used as purgatives under the name of Egyptian myrobalan. The natives eat the sugary pulp of the fruit, and stock also feed on it with relish. Maceration in water produces a refreshing drink.

From the seed an edible oil is extracted which is also used for soap making.

The percentage composition of the fruits is as follows :—

Sugary pulp (including the outer envelope) . .	42.90-44.72
Nut stone (without the kernel)	48.30-44.48
Kernel	8.80-10.80

On the average 100 fruits weigh 696 gm., 100 nuts 336 gm. and 100 kernels 61.4 gm.

The percentage contents of the fermentable sugary pulp are :—

Moisture	26.55
Reducing sugars	37.90
Reduced sugars derived from the inversion of saccharose	2.40

The percentage contents of the kernel are :—

Moisture	7.10
Ash	2.80
Matters nitrogenous	25.32
Matters carbohydrate	18.68
Matters fatty	41.80
Crude cellulose	4.30

It is seen that the kernel contains a considerable amount of oil, but the proportion of oil, compared with the entire fruit, drops to 3.68 % and compared with the nut to 7.63 %. This means that transport to Europe of either the fruit of the "Sump" or even of the nuts alone is not worth while. The kernel is fragile and is extracted with difficulty. The sugary pulp yields 8 % of alcohol with easy and complete fermentation, but the value of this alcohol would be insufficient to make the exportation of the whole fruits an economic proposition.

They have however a real importance for local requirements in districts where the tree grows naturally. They are cracked and lixiviated with water, yielding a liquor which ferments easily and gives an alcohol which can take the place of an internal combustion engine spirit. The stones which remain can be cracked and the kernels extracted in fragments. This condition does no harm if the oil extraction is promptly carried out.

***Merlandra bengalensis* and its Essential Oil.**

DEZANI S., Min. delle Colonie. Boll. di Inform. econom. Rome, 1927 a. 15, n° 1-2, p. 72.

Meriandra bengalensis Benth. is a shrub of the Labiate family, subfamily Stachyoideae-Meriandreae, a native of Abyssinia which also grows wild over an extensive area in Eritrea, between Adi Caje, Az Taclesan and Adi Ugri. The leaves contain enough ordinary camphor to warrant its industrial exploitation.

It grows in uncultivated places forming dense bushes up to 2 metres high. When cultivated it may be cut once a year reproducing a very leafy bush 2 or 3 months afterwards. It was imported into India where it is cultivated in gardens and used in popular medicine as in Abyssinia (1). It can stand drought, is not attacked by locusts, and is refused by all animals except asses. It is propagated easily by means of seeds or division of the adult plant. The average yield of a single plant is 2 kg. of leaves and flowers.

The leaves contain eight-celled glands, rich in essential oil and these glands are found also, though in smaller numbers, on the twigs and the calyx of the flowers.

Submitted to aqueous steam distillation they yield first a yellowish oil and afterwards crystals of ordinary camphor. The oil on cooling forms a butyric mass, which on the separation of stearopten and after purification by repeated crystallizations is found to consist of ordinary camphor.

The writer obtained 600 mg. of camphor from 2 q of leaves but on due consideration of the great losses experienced, he states that a third and possibly even a half of the essential oil of *Meriandra* is ordinary camphor. These results have however only a relative value and must be considerably less than those which the fresh plant could yield if subjected to distillation *in situ*. Drying and transport must certainly be responsible for considerable losses of camphor by volatilization due to drying, keeping and transport.

Ylang-Ylang.

CHALOT C. L'Ylang-Ylang. *L'Agronomie Coloniale*, Paris, 1927, a. 16, n° 112, p. 108.

Ylang-Ylang is an essential oil obtained by the distillation of the fresh flowers of a tree, *Cananga odorata* Hvonk and Thomson, of the family of the Anonaceae. The trade distinguishes the essence of Ylang-Ylang and essence of *Cananga*. The former consists of the "head" of distillation, the other is formed by the "tail", which has a less sweet perfume and is richer in sesquiterpene.

At present Ylang-Ylang forms an important crop in Madagascar

(1) A species possessing the same properties is *M. strobilifera* Benth. (Ed).

(Nossi-Bé) and in the Comoro islands; after these come Réunion, Manilla and Java.

This plant is grown in low land, permeable, of good quality and moist; it suffers from wind and prolonged drought. At Réunion the tree is planted in squares at a distance of 5 to 7 m. To facilitate picking the flowers, and to diminish the effect of the wind, the trees are headed at a height of 2.50-3 m.

A 10 year old tree, if well grown, can yield 10 kg of flowers a year in two crops. Perfectly fresh well developed flowers picked from trees at least 4 years old give the best yield. It is thought that steam distillation might well take the place of water distillation.

The yield of the flowers in "head" essence is 1 % and the same flowers also yield 1 litre of "tail" essence.

The essence is kept in glass vessels with ground glass stoppers, protected from heat and light. The Madagascar essence is despatched in metal receptacles tinned inside.

In October 1926 the following prices were obtained. —

		Francs
		—
Vlang-Ylang of Manilla	1200	per Kg.
» » » Réunion 1st	700	» »
» » » » 2nd	600	» »
» » » » 3rd	250	» »
Cananga of Java	415	» »

The Use of Agave Pulp for the Manufacture of Industrial Alcohol.

BAUD P. La pulpe de l'Agave source de l'alcool industriel. *Les Cahiers Colomaux*, Marseilles, 1927, n° 434, p. LXXII.

Attempts have been made for some years to utilize for the production of alcohol the pulp that remains after the removal of the fibre from *Agave rigida* var. *Sisalana* of Mexico, where the people of Yucatan call it Hennequen Yaaxci.

The leaves, when passed through the machine, yield a fibre from 0.80 to 1.20 metres long which is used under the name of "sosquil" or "sisal" for making cords, etc. There remains a pulp which contains a sugary juice and the latter after filtering gives the following percentage analysis: fermentable sugars 5.4, non-reducing sugars and pentosans 6.6, mineral matter 1.31. The leaves yield in percentage: commercial fibre 5.7, cellulose residues 6.3, clarified juice 88. Under these conditions a ton of leaves would not yield more than 20 to 22 litres of alcohol.

The dried pulp rather resembles wheat haulms in appearance and a ton of leaves yields 90 to 120 kg of pulp. In this state it gives the following analytical percentages: water 8.52; cellulose, vascular material 50.58; mineral and nitrogenous matter 7.36; fermentable sugar 15.15; gums and non reducing substances 17.32. The low proportion of sugar,

which by comparison with the leaves taken from the same plantation should have been 40 to 45 %, is due to the varying chemical composition of the leaves at different times of the year

Considering the average life of the Agave as 15 years and assuming a yearly cut of 20 to 25 leaves, after the fifth year a total of 200 to 250 leaves is yielded, from which are obtained 4 to 4 ½ litres of 95 % alcohol, with an additional 1200-1250 ccs extracted from the trunk when the plant after throwing out its great spike of flowers reaches the end of its life

It should be noted that alcohol production can only be economical for plantations which stretch over thousands of hectares containing 2000-2200 plants per hectare while for smaller areas this type of agave must be considered chiefly as a textile plant in which capacity its fibre can compete with that of the "abaca" or Manilla hemp

Yield of budded Rubber Trees.

HEUSSER, C. Proeftappingen by Hevea-oculaties (With an English summary) *Archief voor de Rubbercultuur*, Buitenzorg, 1927 vol II, No 5, pp. 169-176

Tapping records are given, which contain the results of the tapping of selected clones (nos. 33, 36, 50, 52, 80 and 49) in 1925-1926.

Latex and Rubber from Young Trees.

RIEBL, R., Latex en rubber van jonge boomen (With an English summary). *Archief voor de Rubbercultuur*, Buitenzorg, 1927, vol II, No 4, pp. 155-168,

The quality of rubber from about 8 years old trees, grown at 2000 feet above sea level, shows a considerable improvement in comparison with rubber from the same trees when only 3-4 ½ years old, but it is inferior to that of rubber from trees of the same age grown at a lower elevation.

Properties of Rubber from different Clones and their Mother trees.

DE VRIES, O en SPOON, W Rubber verkregen van oculaties II Onderzoek van latex en rubber verkregen van eenige Cultuurtuinclonen en hun moederboomen (With an English summary) *Archief voor de Rubbercultuur*, Buitenzorg, 1927. vol. II, No 4, pp 112-149.

The properties are described of the latex and the rubber from six clones grown in the Economic Gardens (Cultuurtuin) of Buitenzorg and a comparison is made with the latex and rubber from the mother trees.

AGRICULTURAL ENGINEERING

The Organization of an Electric Tillage Plant.

HUBERT, C. Organisation d'un chantier de labourage électrique. *La vie agricole et rurale*, Paris, 1927, t. XXX, n° 15, p. 230-232.

The apparatus used in electric cultivation must be powerful in order to work the ground at all seasons and at any depth required, and to accomplish a large amount of cultivation each working day. The "Société générale agricole" recommends its high power plant; windlasses furnished with 100 h.p. motors capable of developing 225 h.p. for short periods. An installation of such a plant can plough 600-900 ha. a year, or even more if night ploughing is well organized.

The transport of the tackle to long distances should be avoided; the ideal sphere of action is an area of only 10 km. wide.

In districts of large scale farming these conditions can be realized. In others, cooperative societies can be established to include a large number of proprietors on one area where mechanical cultivation can be used to advantage.

Generally speaking a very useful practice is to let the work out to a special contractor who has his own tackle. The risks, responsibility, work and care of the machinery are thus better defined and the whole execution is facilitated. The writer speaks of contract work even in the case of cooperative mechanical cultivation.

Electric tillage operations can be accomplished with a slightly less powerful plant than that recommended, and a set of tackle exists which is not self propelling on the road and is suitable for large estates.

A Mower for Steep Hillsides.

Farm Implement News, Chicago, Ill., 1927, Vol. 48, No. 22., p. 25.

The Farmall mower was recently very successfully demonstrated at the Clemson College farm in S. Carolina cutting tall Johnson grass up and down and across a steep slope. A 7' mower is used, power for operating the cutter bar coming steadily from the tractor engine by a power take off. 1 man can thus cut 25-30 acres a day and so replace 2 or 3 men and 4-6 horses or mules. Steering is very easy. In making short turns a

brake acts automatically on the inside rear wheel and the machine pivoting on the latter turns on a radius of 8 feet.

Trials of Sub-Soiling in 1925, in England.

The Journal of the Ministry of Agriculture. London, 1926, Vol. XXXIII, No. 6, pp. 513-517.

The trials which were undertaken in Essex and Oxfordshire under the direction of the Ministry of Agriculture and of the East Anglian Institute of Agriculture have given very important results.

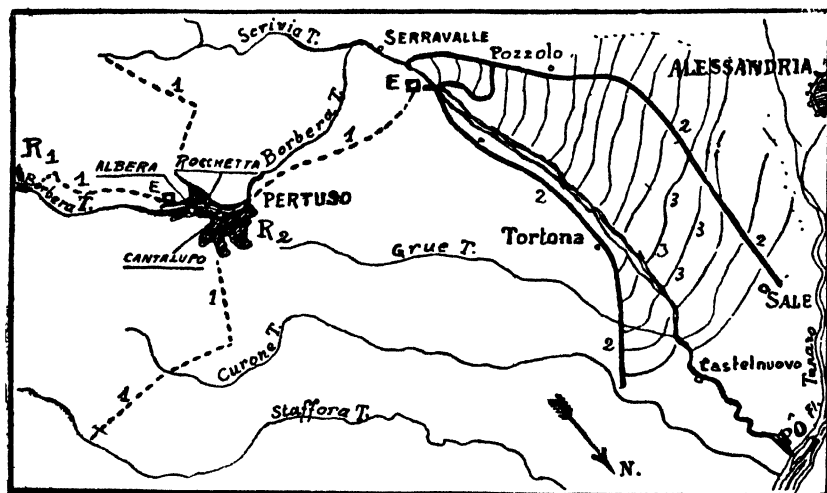
The attached list shows that in almost all cases, there is a great increase in yield as the result of sub-soiling.

Depth of sub-soiling	Crop	Yield in cwt per acre	
		grain	straw
Sand and gravel (field I)			
Without sub-soiling	Flax	9.7	14.2
5 inches	”	12.3	19.2
7 inches.	”	12.8	19.0
9 inches	”	13.1	17.4
Boulder clay			
Without sub-soiling	1924 Beans	19	18
5 inches.	” ”	25.1	23
7 inches.	” ”	23.5	21.3
Without sub-soiling	1925 Wheat	14.2	24.9
5 inches.	” ”	15.7	25.6
7 inches.	” ”	14.6	21.6
Without sub-soiling	1925 Barley	8.9	9.5
7 inches.	” ”	12.3	12.4
London clay			
Without sub-soiling	Wheat	17.4	27.3
7 inches.	”	22.8	34.0
Oxford clay			
Without sub-soiling	Oats	22.3	20.3
5 inches.	”	27.6	25.3
7 inches.	”	26.3	25.8

Irrigation in Italy : the Artificial Lake of Val Borbera.

CORNALI Gino. Una grande opera d'irrigazione : il lago artificiale di Val Borbera. *La Terra*, Bologna, 1927, a. III, No. 1, p. 8-10.

Scheme adopted for the irrigation of a region of the province of Alessandria, where not only is the rainfall scanty but its distribution is unfavourable to agriculture. Two reservoirs are planned, one for one million cubic metres, the other for 162 million, 7 km. long and from 1 to 2 km. wide. They will be constructed on the course of the Borbera. A dam will be made at Pertuso, the locality being suitable as the valley



Irrigation Scheme in the Alessandria region, Italy :

- 1 1 Industrial canals with electric power stations.
- 2 2 Feeder Irrigation canals.
- 3 3 Distributor Irrigation canals.
- R₁ R₂ Reservoirs on the Borbera.
- E. Hydroelectric power stations.

narrows there, and also the rocks are compact and impermeable. Three centres of population will be submerged by the artificial lake thus formed, and the inhabitants will receive either compensation in money or a new house in the new villages which it will be necessary to build. The total number of families displaced will be 300, or 1500 persons in all.

Provision is made for the construction of 70 km. of canals. Some of the main canals will serve as a source of energy by means of hydroelectric installations, supplying 110,000 000 kwh. yearly. The total expenditure is estimated at 150,000,000 liras.

Combination Farm Operations.

· ENDRES F. (Westerhorn). Verkoppelung von Arbeitsvorgängen. *Deutsche Landwirtschaftliche Presse*, Berlin, 1927, Jg. 54, Nr. 13, S. 172-173, 5 Abb.

The writer in this article stresses the remarkable possibilities on which are based ideas for combined farm operations. Such a process offers to agriculture in many respects that which industry owes to continuity of work.

The increased work capacity achieved by the use of mechanical in place of animal power is becoming to-day continually more evident in the widening of the scope of any particular operation, while very important advantages accrue from combining different operations into a single organic whole.

The idea is illustrated by sugar beet harvesting. The system in vogue is first, in order to facilitate pulling of the roots to loosen the soil well and deeply, a process which brings it into a condition distinctly unfavourable for their transport. Then after the ground has been well stamped down by the process of removal there is all the trouble of loosening it again with the plough. In fact each successive operation is made noticeably more difficult by the preceding one.

Now the manifold traction power of the mechanical drive permits the following combined operations:— the plough, which is necessary later, is introduced at the beginning of the above operation; it is constructed and controlled in such a way that of its 4 shares nos. 1 and 3 run immediately beside the already topped roots, which fall in the path of the plough, and make an open furrow beside each row into which the roots can be easily pushed by a hoe. They are next caught by a lifting apparatus and raised on to a container forming part of the outfit, in which they are then carried to the end of the field and deposited.

Drainage Ploughs.

DE STEMPOWSKI. Charrues pour drainage. *Journal d'Agriculture pratique*, Paris, 1927, an. 91, t. 1, no. 17, p. 333-336, 2 ill.

This article describes the drainage ploughs known as "mole ploughs".

These ploughs are meant for digging channels in the subsoil, parallel to the surface of the soil to take the place of ordinary tile drainage.

The main part is a steel shell thrust into the soil at a convenient depth and pulled along parallel to the surface by a plough of special design, which splits the soil.

This plough is generally pulled by a tractor.

The following observations may be made:—

From the point of view of speed, an instance is given of the draining of 1 hectare in between two and a half to three hours with drains 2 m. apart and in between an hour and a quarter to an hour and three quarters with drains 3 m. 50 apart.

These machines penetrate to a depth of from 50 to 70 cm. In England

the first drains excavated by this method were at a depth of 75 cm. They are now excavated at 60 cm. and for ordinary soils a distance apart of 4 m 50 is used

In very heavy soils, the drains are excavated at a depth of 30 to 40 cm at 2m 75 apart

The diameter of the drains is from 5 to 7 cm. When the draining machines are drawn by steam tackle, shells excavating drains from 9 to 10 cm in diameter are used.

Concurrently with these mole ploughs, excavators are employed which dig out a real trench

Some difficulties have been raised with regard to the use of this method of drainage the machines follow the soil's undulations and it is feared that at certain times the channel would be in the wrong direction. It is also necessary to have a light soil and to treat it at the proper time, if the soil is too dry, the expenditure of power is very high.

ANIMAL HUSBANDRY

Maisarin, a New Molasses Feed.

IIAMPL, Ein Schweinemastversuch mit Maisarin, *Deutsche Landwirtschaftliche Presse*, Berlin, 1927, Jahrg 45, Nr 11 S. 147. — KUHNERT, Haersatz durch Melassegemisch Verfütterung, *Elenda*, Berlin, 1927, Jahrg, Nr 15, S. 202.

The German firm, *Kraftfutter-Fabriken Company Limited* at Altona (Elbe) has lately manufactured a feed from molasses and the refuse of the manufacture of maize starch and maize syrup, to which the name of "Maisarin" has been given. Maisarin contains 21 per cent. protein, 1 % fat and 30 % nitrogen free extracts.

The pig feeding trials were conducted by HAMPR, who confined himself to determining the absolute economy value of a composite feed into which maisarin had been introduced. They were attended by very unfortunate circumstances. The animals under test suffered severely from foot-and-mouth disease, and one of them had to be slaughtered at an early stage. In spite of this, the author formed the opinion that maisarin is a thoroughly useful food, readily eaten by stock and has no prejudicial effect on the quality of the meat.

A more detailed report is furnished by KUHNERT on the experiments

made by STOLL. The latter conducted two trials, using two teams of horses, substituting maisarin for part of their ordinary oats ration.

The following table summarizes the results of the trials as given by the author :—

Feeding Trials with partial replacement of oats by maisarin.

Two teams kg.	Per head and per day			Average increase or decrease in weight (two animals) kg.
	Hay kg.	Oats kg.	Maisarin kg.	
1. Trial: (30 days) busy time.				
Near horses	5	7	—	29 decrease
Off horses	5	5	3	1 increase
2. Trial: (20 days) slack time.				
Near horses	5	6	—	15 increase
Off horses	5	4	2	60 increase

Apart from this very favourable result of maisarin as a food the investigator states also that he has not observed any untoward accompanying phenomena, such as appear on feeding with Indian corn *e. g.* sweating and roaring; that the food is eaten readily by horses and the number of cases of colic is greatly diminished by the molasses constituent. Since it is also clearly cheaper than the oats replaced, there can be no question of the economic advantage of the feed.

The author recommends the replacement of one-third of the oat ration by maisarin so that the animals may get gradually accustomed to the new feed.

The Effect of Feeding Thyroid to Fowls.

HUTT, E. B., University of Manitoba, Winnipeg. *Scientific Agriculture*, Ottawa, 1927, Vol. VII, No. 7, pp. 257-260.

A summary of experimental work on results of thyroid feeding. The following conclusions are reached :—

Thyroid fed in more than physiological doses (1) has a marked effect on the pigment-forming mechanism of the bird ;

(2) results in interaction with the gonad resulting in the assumption of female plumage by the male and a rejuvenation of the senile fowl of both sexes ;

(3) is a stimulant to moulting followed by rapid growth of feathers. This is due to a more rapid rate of cell division induced by the increased oxidation resulting from feeding thyroid.

Poultry Disease control.

LAIRD, F. A. *Journal of the American Veterinary Medical Association*. September 1926, page 717.

Many poultry diseases have increased with the development of the farm flocks throughout the Middle West. The future of the poultry industry is largely dependent upon the control of these diseases.

The increasing loss from bacillary white diarrhoea has attracted attention in Illinois and other States in recent years. In Illinois the agglutination test made at the University is recognised and rules are prescribed to guide the poultryman.

A B.W.D. free certified flock of chickens is one in which the entire flock has passed two successive annual or three successive semi-annual physical examinations and agglutination tests, and in which the flock is maintained under sanitary conditions.

Important investigations of the Illinois and Nebraska stations have definitely linked tuberculosis in pigs with the avian type of the disease. Investigations in Illinois show that avian tuberculosis may sometimes find root in young calves. These findings are of sufficient importance to justify keeping tuberculous poultry separated from cattle and other animals.

The Method of Honey-Production by Bees and Time involved.

SCHÖNFELD A., Jak a jak rychle vytvářejí včely med. *Věstník Československé Akademie Zemědělské*, Prague, 1927, a. III, n° 3, p. 228-230 (French Translation pp. 229-231).

During the analysis of honey carried out at the State-Institute of Apiculture at Prague in application of the decree of the Ministry of Agriculture of 27 February, 1925, the aim being to prevent the introduction into Czecho-Slovakia through honey of contagious bee diseases, the writer noticed in honeys which were apparently the same even in taste, but came from different parts, surprising differences in composition.

Thus the ratio between glucose and levulose varies with the place of origin as follows: Prague 100:104 — Slovakia 100:111 — Carpathians 100:113 — Hawaii 100:99 — California 100:102 — Brazil 100:135 — Argentina 100:141 — Poland 100:155. Similarly the percentage of saccharose varies thus: Prague 4.91 — Slovakia 9.98 — Carpathians 3.06 — California 0.11 — Jamaica 0.57 — Chile 1.17 — Rumania 5.76 — Austria 6.25 — Hungary 9.02. (The value of honey increases as the quantity of saccharose decreases). The amount of albuminoids varies from 0.12 to 1 %.

In investigating the reason for these differences which exist despite the fact that the species producing the honey is always the same, the writer was led to look for it in the different composition of the nectar of the very different flora in the various countries. In order to test the accuracy of this hypothesis he fed swarms on 3 different sugar solutions:

(a) sugar dissolved cold in an equal weight of water; (b) sugar dissolved hot in half its own weight of water; (c) as in (b), but with the addition of citric acid that presumably would help the inversion of the saccharose.

After 12-26-108 hours the honey which had been made by the bees fed in this way was extracted and analysed. After 108 hours the combs were finished and the preparation of the honey completed, as was shown also by its degree of concentration.

The composition of the honey obtained on this occasion from the 3 nutrient solutions was as follows:

The effect of feeding on the composition of honey.

Composition of the honey in %	Nutrient solution		
	a	b	c
Water	19.5	17.4	19.1
Saccharose	26.97	40.20	49.18
Invert sugar	51.10	47.94	30.32
Glucose.	22.33	17.12	14.06
Fructose	28.77	20.82	16.26
Albuminoids	9.206	0.144	0.125

The bees inverted respectively 48.14 — 37.46 — 17 % of the saccharose contained in the nutrient solutions a, b, c, hence the greater the concentration of the nectar in saccharose, the less the quantity that the bees can invert. This also applies to the activity of invertase.

A common honeybearing plant with a nectar very rich in saccharose is *Robinia Pseud-acacia*.

AGRICULTURAL INDUSTRIES

Decolorizing Carbons and their Action on Molasses.

GARINO M. and BENVENUTO G. Carboni decoloranti e loro azione sul melasso. *Giornale di chimica industriale e applicata*, Milan, 1927, a. IX, n. 4, p. 169-275, 8 fig.

The writers make a comparative study of the action of the following carbons on the substances usually present in molasses, basing it on the decolorizing power of animal carbon.

	Chemical analysis		
	Humidity %	Ash %	Carbon % (by difference)
(1) Animal Carbon	5.34	82.54	12.12
(2) Anticromos O. (Fabb. Italiana Anticromos) . . .	3.39	6.79	89.32
(3) B. A. S. T. Carbon (Badische Anilin und Soda Fabr.)	10.536	7.241	82.206
(4) "Carboraffino" No. 1 (Verein für ch. und Med. Prod.)	24.616	1.684	73.80
(5) H. Carbon	15.30	10.82	73.88
(6) M. Carbon.	17.63	7.12	75.25
(7) Norit Supra (Allgemeine Norit Maatschappij). . .	7.05	3.65	80.30
(8) Polycarbon Supra (Chemische Werke Carbon, Vienna)	9.744	7.542	82.714

First series of experiments: determination of adsorption velocity. — 2500 ccs. of 10 % molasses solution were heated on a water bath to 85-90°C in a vessel with a mechanical stirrer; 2 gm. of decolorizing agent were quickly added, *i. e.* 1 % of the dry matter contained in the solution, except in the case of animal carbon of which it was necessary to add 100 gnl. to obtain a decoloration comparable with that given by the others. After about 55 minutes about 60 ccs. of the liquid were removed and filtered quickly (in one minute) through a Buchner filter. Sampling and filtration were so repeated as to be able to determine the percentage decoloration after 1-2-6-10-15-30-45-60 minutes respectively. A table of results so obtained by the Stammer colorimeter shows that adsorption by animal carbon and "M carbon" is slow, whereas that by "Carboraffino", "Norit Supra" and "Anticromos" is very quick.

Second series of experiments: maximum decoloration with each type of carbon. — To 1500 ccs. of 10 % molasses solution (Brix 7.72, Stammer 360) heated on the water bath to about 90°C. were added amounts of decolorizing agents equal to 3 % of the dry matter of the solution; the whole was stirred for ten minutes and then quickly filtered through a Buchner filter; the filtrate was tested by the Stammer Colorimeter and the Brix method. The treatment and testing were continued until a fresh treatment failed to produce any further sensible reduction of colour.

The results grouped in three other tables show among other things :— That the colouring matters in molasses are partly adsorbed by the carbons very easily and partly to a very small extent; that the same extent of decoloration cannot be reached by all the carbons; that the different carbons show different capacity for adsorbing the different colouring matters, *e. g.* those of the "Carboraffino" and "Norit Supra" types (as also animal carbon used in large quantities) adsorb almost entirely the red-brown and yellow brown colouring matters, leaving a coloration of a distinctly green shade, whereas "Anticromos" and "Norit" leave a yellow-brown coloration, which completely masks the greenish tint.

Practical Notes on Fermentation in Copper Vats.

MEUNIER M. *Bulletin de l'Association des Anciens élèves de l'Institut supérieur des fermentations de Gand*, Ghent, 1927, a. 28, t. 36, n. 7.

The writer states that opinions are divided on the subject of the employment of copper fermentation vats in brewing. Copper has two advantages; it is a good conductor of heat, and it always has a considerable value when resold, as "scrap".

On the other hand, copper is readily attacked and verdigris acts as a poison on brewers' yeast. Tinning the surface of the copper cannot be recommended, as the tin very often causes cloudiness in the beer.

In conclusion, the author does not advise the use of copper for making brewers' vats.

A Use for the Plant and Seeds of the Mercury Family.

GILLOT, P. *Annales de la Science agronomique*. Paris, 1926, an 43, n° 6, p. 389-396.

The different mercury species hitherto considered as weeds have oil seeds from which an oil with valuable characteristics can be extracted. The composition and the characteristics of the oil of 3 native varieties are here given :—

These analyses show that each of the botanical species has well defined chemical characters.

It may be said that the mercury family produces a very drying oil. It lends itself excellently to the manufacture of imitation rubber, is very

Chemical Composition of Mercury species.

	M. annua	M. perennis	M. tomentosa
	%	%	%
Water	6.80	8.58	6.72
Fatty matter	38.05	26.45	35.62
Nitrogenous matter	13.55	19.43	15.25
Cellulose	31.91	39.55	33.13
Reducing sugar	0.09	0.30	0.07
Hydrolysable sugar	1.29	1.49	0.97
Starchy matters.	0.39	0.10	—
Ash	7.92	4.10	8.24

*Characteristics of the Oil of Mercury species
and Comparison with that of Linseed.*

	Density at 15°	Refraction Index at 15°	Iodine Index	Bromo- Glycerides
				%
Oil of <i>Mercurialis annua</i> L.	0.9348-0.937	1.4848-1.4801	205.9-215.5	65-80
» <i>M. perennis</i> L. . . .	0.9343-0.937	1.4840-1.4857	203.6-208.3	54-58
» <i>M. tomentosa</i> L. . .	0.934-0.935	1.4840-1.4852	201.5-208.1	52-68
» <i>Linum usitatissimum</i> L.	0.930-0.935	1.4810-1.4835	173.0-201.0	23-38

useful for rendering fabrics waterproof, can be used for making lithographic inks and varnishes and is very suitable for use in painting.

Finally the writer as the result of observations and trials on fowls and guinea pigs shows that the seeds of *Mercurialis* spp. are not poisonous, being eaten alone or in cake form without ill effects by these animals, despite a widespread belief to the contrary.

The writer admits the possibility of their growth on a commercial scale.

New Methods of Converting Straw to Industrial Uses.

DU BOISTESSELIN H. *Revue agricole de l'Afrique du Nord*, Algiers, 1927, an. 25, n^o. 404, p. 266-270.

This article describes methods of converting straw into molasses and also into paper pulp.

The following description is given of the method of manufacturing straw-molasses. The straw material with a water content of 10 % is chopped up and afterwards mixed with an equal weight of water, containing 3 % of sulphuric acid. The resulting mass is kept in motion and treated for an hour with a steam jet at a pressure of 6 to 7 kg.

A ton of straw thus treated provides 500 kg. of molasses containing 255 kg. of dry extract and 150 kg. of reducing sugars. In similar conditions a ton of beech-fir, and birch-chips gives 230 kg. of dry extract and 111 kg. of reducing sugars.

The molasses is used for the manufacture of fuel briquettes. Five tons of straw-molasses made from 10 tons of straw, are required for making 100 tons of briquettes.

Straw-molasses is also used in foundries and tanneries. A factory making 100 tons of briquettes a day would use 3000 tons of straw in the year.

As regards paper pulp made from straw the writer calls attention to the good results obtained by the chlorine process (CATALDI) at the "Società Elettrochimica Pomilio" in its experimental factory at Naples. This process produced 37.8 % of white cellulose as against 31.25 % given by the sulphate process. The process is recommended as a solution of the problem of the over-production of chlorine. According to the writer a factory of electrolytic chlorine can normally have its cellulose factory as an annexe. On the other hand, unless a considerable capital is employed, a cellulose factory is not worth building for the purpose of adopting the chlorine process.

The Fixation of Bacteria in Market Milk Samples

COLE, W. E., ALLEN, P. W., CAMERON, G. M., University of Tennessee, *Journal of Bacteriology*, Baltimore, 1927. Vol. XIII, No. 1, pp. 63-64.

An attempt to discover a fixative which on application to milk will prevent both multiplication and disintegration of bacteria and so allow of bacterial counts of milk samples several days after they have been taken.

Some of the materials tested are :— listerine, lysol, phenol, potassium permanganate, formaldehyde, mercurochrome, mercuric chloride.

Results to date on several hundreds of samples have shewn that 1 part listerine to 1 part milk fixes the bacteria as described above.

The Use of Lime in Butter-Making.

OVERMAN, O. R., *Industrial and Engineering Chemistry*. Washington, D. C., 1927, Vol. 19, No. 5, pp. 571-573. bibliography.

The writer deals with the problem of reducing the acidity of cream before butter making. Butter made with cream of excessive acidity shows a tendency to develop an unpleasant flavour on storing.

Various alkalis have been tried, the aim being to find a neutralizing

substance which will (1) reduce the acidity of the cream so as to allow of efficient pasteurization, (2) reduce the butter-fat losses in the buttermilk, (3) improve the keeping quality of the butter and (4) be free from serious objection by officials charged with the enforcement of laws regarding food adulteration, etc. Once the butter is made there is no possibility of removing evil flavours etc.

In the U. S. A. the tendency has been to employ the calcium or magnesium limes, in the British Empire the sodium compounds.

Necessary standards and methods are noted and discussed.

The acidity of the cream should be reduced to between 0.3 and 0.2 %. To gauge the amount of neutralizer the acidity of the cream must be accurately determined before mixing e. g. against N/10 NaOH using phenolphthalein.

The most common danger lies in imparting a soapy flavour to the butter. Hydrated lime used intelligently would appear free from this objection and is the substance usually employed in the U.S.A. It is used in suspension in water.

The actual method of making the lime mixture and the possible desirability of using one of the magnesium limes are discussed.

Stress is laid on the necessity of eliminating all lumps in the lime and of its application in the form of a fine spray over the surface of the cream, which is kept in vigorous agitation throughout.

The method has allowed of the making of uniform butter at the various creameries and of a definite market for a farm product, which previously sometimes failed to find a market.

SYLVICULTURE

Some Reflexions on the Problems of Heredity.

BURGER, H. Einige Gedanken über die Vererbungsprobleme. *Zeitschrift für Forst- und Jagdwesen*. Berlin, 1927, Jahrg. LIX, No. 4, p. 193.

After a general discussion of the theories of evolution and of heredity, particularly those of LAMARCK, DARWIN and JOHANNSEN the writer treats specially of the application of these theories to the heredity of forest plants. In the writer's opinion, no forester can deny the existence of a struggle for life among the forest species. Every skilled forester knows that to get a good natural regeneration millions of seeds must be planted, but that in forest stands which can be used at an age of 100-150 years very few trees are found which have sprung from that seed.

Even though many scientists acknowledge the struggle for existence theory they cast doubts on the statement that selection forms the race, since in general not enough account is paid to the advantages accruing to separate individuals by reason of small morpho-anatomical changes. From the silvicultural point of view physiological peculiarities of varieties and species are generally of considerably greater importance than morpho-anatomical differences. It is greatly to be desired that heredity specialists should study these problems somewhat more closely.

LAMARCK's theory on the adaptation and on the inheritance of acquired qualities is nowadays considered false. But ENGLER, although a convinced Lamarchist, has always held that the damage caused by wind, by snow pressure, cutting etc., i. e. purely incidental damage, is not hereditary and that heredity is only seen in the qualities of a stock which are due to environment, to habitat (soil, climate etc.).

The origin of "Klimarassen" or stocks produced by climate is explained by the writer on the basis of JOHANNSEN's "Forest stands theory"; but he says that the theory of natural selection in the struggle for existence must be applied to account for the derivation of a pure line stock from a multilinear stand.

JOHANNSEN's theory on pure lines and on forest stands is insufficient to explain "Formrassen",

The origin of "Standortsrassen" (stocks whose form is determined by their habitat) has not yet been explained by any theory. It is however

quite likely, as ENGLER actually believed, that stocks derived from form and those produced by climate may owe their derivation to nutrition problems. If, at some future date, exact experiments were to bear this out the specialist would explain influence on descendants by a parallel induction.

The author considers that as regards heredity LAMARCK's and DARWIN's theories cannot be entirely rejected, though regarding JOHANNSEN's pure line theory there are still certain doubts.

The problem of the varieties of species, which is of the utmost importance to silviculture, has been clearly exposed in practice but not in accordance with existing theories. The writer however considers that the experiments which have actually been carried out in practice are sufficiently lucid, and it is greatly to be regretted that no country has as yet deduced from them their logical conclusions.

The Growth of the Wood of Ash and Douglas Fir.

CHAIK, L. M. A., *Quarterly Journal of Forestry*, London 1927, Vol. XXI, No. 2, p. 102.

This subject was studied between the months of March and December 1926 at Bayley Wood (Oxford). The growth method was examined by two methods. The first consisted in making a series of transverse cuts at intervals during the growing period and measuring in each case the width of the new annual ring; in the second the circumference of the trunk was measured as it stood by means of a dendrograph.

Both methods while presenting certain advantages also shewed imperfections which detracted from their accuracy. A third method, which is adopted by many foresters and recommended by the writer consists in extracting at intervals, during the growing period and from the same tree as it stands small segments of wood containing the inner bark, the cambium and the xylem. These pieces are sectioned and the width of the woody ring measured microscopically. The writer employed this method in his experiments, extractions being made every one or two weeks according to the size of the tree.

The following conclusions were reached:—the growth of the Douglas Fir started at an earlier date in thinly planted stands but was very slow in the period preceding the beginning of growth of the trees in the thickly planted stands. The growth of the upper part of the trunk began 10-14 days before that of the lower part, but there was no appreciable difference between the north and the south sides of the trunks.

No comparison was possible between growth in thin and dense stands of ash trees. All the ordinary ash trees were growing in thinly planted stands. Moreover no difference could be observed in the ash between the initial period of growth of the upper parts and that of the lower parts of the trunk. The sides of the trunks having a southern aspect shewed an obvious tendency to start growth before those facing north.

The growth of the trunks of the Douglas Fir started about 12 days be-

fore the filling of the leaf buds. At the time that the first terminal buds opened, $4\frac{1}{2}$ -8 % of the new annual ring had been formed.

In the ash, the growth of every part of the trunk began a week before the opening of the flower buds. At the moment of opening of the leaf buds 5-9 % of the new woody ring was already formed. Ash growth ended in mid-August, that of the Douglas Fir in mid-September. The winter buds of both were fully developed about 21 July. The ash leaves fell at the end of October.

The growth of the Douglas Fir in densely and sparsely populated stands slowed down at the end of July and of June respectively. These times correspond in both cases with the conclusion of the spring wood formation, and the percentage of this last is proportionately greater in trees of sparsely populated stands where the rest period arrives later.

No rest period was noticeable in the case of the ash. Its growth, compared with that of the Douglas Fir, tended more to take place at the beginning of the season ; it was more rapid in the months of June and July and stopped abruptly at the end of the season.

The average radial diameter of the first rows of spring vessels continued to increase for 5-7 weeks. The detached vessels developed more quickly in tangential than in radial diameter.

Relationship between Weather and Fire Risks.

I. CHAPMAN, C. S. Weather and Forest Fires.

II. BURRILL, M. F. Weather and Fires from the Standpoint of Meteorologists.

III. SHOW S. B. Weather and Fire Research. *Journal of Forestry*, St. Paul, Minn., 1927, vol. XXV, No. 4, pp. 457-462 and 467-477.

I. The obvious relationship between weather and fire risks was responsible for a movement being started at Portland, Oregon in 1916 to secure advance information from the U. S. Weather Bureau of the occurrence of periods of fire weather. This movement, as Mr. Chapman says, was followed by a period of intensive investigation of causes for the variation in the fire risks and nearly all the investigators arrived at practically the same conclusion that, other conditions being equal, the degree of forest fire hazard varies inversely with the amount of available water vapour present in the atmosphere. While some authorities use as an index of risk absolute humidity, as indicated by the vapour pressure or the temperature of the dew point, necessarily considering current temperature with relation to both, the majority incline to the belief that relative humidity, or percentage of saturation of the atmosphere, is simple and a readily understood index. Further studies, over large areas and under differing forest conditions, serve to strengthen this belief.

Generally then, the weather affects the fire hazard ; firstly, by its seasonal effect on the normal course of development of fire material ; second-

ly, by occasional and sporadic, more or less acute, departures from the seasonal form of humidity, causing acute inflammability of fire material ; and thirdly, through the occurrence of thunder-storms. The forecasting of the two phases enables fire prevention and suppression agencies to take added precautions. To be of value, such forecasts must be accurate and highly localized.

II. According to Mr. BURRILL, the inflammability of the fuel is of course the governing factor in the start of a fire. The foresters have shown that when the layer of leaves, and raw humus on the forest floor, contains water to the extent of 25 % or more of its dry weight, no ordinary brand such as cigarette end or pipe heel will start a fire.

The degree of inflammability depends on the moisture content, temperature, and size of the fuel, as well as the ease with which it will dry when heat is applied. The extreme hygroscopicity of the dead leaves and small wood fuel leads us to expect that the absolute and relative humidity of the atmosphere may play an important part in determining the rate of reduction of the moisture content of these fuels. Studies carried on by the Northeastern Forest Experiment Station indicate that a tenth of an inch of rain suffices to keep the moisture content of the dead leaves above 25 % for a period of three or four days. Mr. BURRILL recommends that all watchmen be equipped with psychrometers, in order that information may be had on the variability of conditions within a large region.

III. A step of very great importance was taken in experiments begun by GIBBORNE in Idaho, some years ago, which showed for the first time that fire risks were controlled directly by the moisture content of fuels, and that fluctuations in humidity, temperature, wind and precipitation were important as they affected fuel moisture. The progress in this direction has been rapid, particularly in the development of instruments for measuring moisture of fuels in place, and in interpreting regional forecasts in terms of fuel moisture and hence of fire hazard. One clear result has been that it is a combination of weather factors rather than a single one which must be watched.

Summarizing, the writer says that the short term prediction problem has been fairly blocked out and a fairly definite basis for regional predictions of changes in fire danger has been provided. A further advance in the field has been the study of weather conditions which result in lightning storms. This phase has so far progressed that the prediction of lightning storms by the Weather Bureau has begun.

It is essential that the actual behaviour of fires should be studied in order to know, for example, the reasons why a fire ceases to be a surface fire and becomes a crown fire. The writer remarks also that no one has even tried to study the cumulative effect of a series of years of subnormal precipitation such as occurs in California. It would seem that an enquiry on these lines might lay the foundation for a better understanding of the general character of fire seasons.

Forest Fire Losses in the South of the United States.

American Forests and Forest Life, Washington, 1927, vol. 33, No. 399, p. 180.

Nine Southern States suffered a loss of \$18,000,000 from forest fires in 1925 which burned over 22,000,000 acres of forest lands. These figures are taken from a report by the Forest Service after an analysis had been made by the Southern Forest Experiment Station at New Orleans from estimates collected by the State foresters. This loss represents 64 % of the total loss from forest fires in the United States.

Although the area burned over constitutes more than 84 % of the total area destroyed by fire in the United States, forest officers point to a decrease of 35 % over the 1924 loss. This advantage is partly due to more favourable fire weather, and partly to the more efficient fire fighting organization of private landowners and State forestry departments.

Of the total loss of \$18,000,000, 89 % represents the estimated damage to forest tree growth. The difference in methods used in the various southern States of estimating fire damage made it impossible to distinguish between the loss to merchantable timber and to immature trees. It was also impossible to estimate the proportion of the fire-killed timber which may have been salvaged following the 46,382 fires in the South.

E. L. DEMMON of the South Forest Experiment Station, who analysed the estimate, expresses the opinion that the "huge money value of the timber burned each year by forest fires in the South should make clear the importance of fire prevention".

Notes on the Natural Regeneration of Eucalyptus.

KESSEL, S. L. *The Australian Forestry Journal*, Sydney, 1926, vol. IX, No. 12, p. 321.

In Australia, says the writer, there is a general opinion that the seeds of almost all the indigenous trees must undergo the action of fire in order to be able to germinate.

Accurate observations made in different types of Eucalyptus forest have, on the other hand, proved that the effect of a fierce surface fire is the destruction of all the Eucalyptus seed which is found on the soil and in its upper layers. Natural regeneration is therefore due to seed which is still on the trees at the moment of the surface fire. Consequent on the above noted circumstances, three factors affect regeneration, namely: — (1) the frequency of years of abundant seeding; (2) the extension of the period during which fertile seeds remain on the trees after ripening; (3) the weight and structure of the seeds which affect the distribution of the latter. Where it is a case of Eucalyptus with fairly small light seeds, such as "Tallow wood" (*Eucalyptus microcorys* F. Muell) the seeds in falling are distributed over a more extensive area, while the heavy seeds of other species, such as "Jarrah" (*Eucalyptus marginata* Sm.)

fall almost vertically. In the latter cases the number of trees left as seed bearers necessary for assuring natural regeneration becomes much greater, and the even distribution of these trees on the forest surface becomes an important factor for the purpose in question.

Rightly or wrongly, the burning of the surface of Eucalyptus forest will for many years to come be adopted in Australia as a means of assisting natural regeneration, and consequently a clear comprehension of the effect caused by fire in this respect becomes very important.

One consequence of the method of surface fires is that the fall of seeds, which germinate after the fire, takes place more or less contemporaneously instead of being spread over two or more years.

The germination of seeds fallen after a surface fire takes place under very good conditions because the seeds are in contact with the mineral soil and the seedlings have no difficulty in producing cotyledons.

Surface fires affect the growth of the young seedlings after the cotyledonary stage in two ways:— (1) They considerably reduce the live cover of the soil. In dry types of forest the struggle of the roots against the underwood is considerably diminished; while in the moist type, where competition for the moisture of the soil is less intense, the young seedling commences life in conditions equal to those of the more succulent grass and consequently has greater possibility of succeeding in the struggle for light. (2) The ashes produced by the surface fires supply the plants with a nutrient in soluble form.

In certain forests of the dry type these ashes constitute an excellent fertilizer. The writer cites, as example, that in a "Tuart" (*Eucalyptus gomphoccephala* D. C.) forest in South-east Australia, in spite of the surface being covered with an abundant new growth, the seedlings had only survived in considerable numbers in beds covered with ashes.

The writer declares that the value of the ashes as fertilizer suffices to explain the above-mentioned fact, without any need for discussing the possible effect of the fire on the bacteria and protozoa of the soil.

The want of success of the new growth in the beds where the layers of ashes were very thick is, according to the writer, due to an excessive concentration of soluble salts.

It is intended, by means of further research, to determine what salts are most likely to cause the seedlings in certain dry types of forest to survive, with the object of obtaining satisfactory growth by means of partial sowings on cultivated areas or on bare places.

The Swamp Cypresses of China and North America.

HENRY A. *Transactions of the Royal Scottish Arboricultural Society*, Edinburgh, 1926, vol. XL, Part II, pp. 105-7.

The writer describes the swamp cypresses, *Glyptostrobus* of China and *Taxodium* of North America. The distribution of these two genera at the present time is much restricted in area and practically confined to

marshy sites where the roots of the trees develop peculiar woody growths called "knees", which project above the soil and enable the roots to breathe when the ground is inundated. The Chinese species (*Glyptostrobus pensilis* C. Koch (*Taxodium heterophyllum* Brnqn.) has died out in the wild state and is known only in cultivation in two limited areas around Canton and Foochow. The Chinese peasants plant it beside their villages to bring luck to the family home and amongst the rice fields to increase the crop.

The wood of both *Taxodium* and *Glyptostrobus* is valuable on account of its strength, fine grain, and remarkable durability under trying conditions of moisture.

The author draws attention to the desirability of making plantations of swamp cypress on unproductive marshy land, *Glyptostrobus* being recommended where the climate is subtropical, and *Taxodium* in the warm temperate zone.

In Europe, *Taxodium distichum* Rich. (bald cypress) is often planted as an ornamental tree, but has seldom been tried on a plantation scale. There are small groups of this species near the sea at Pisa, in the Pineta di Migliarino, which show remarkably vigorous growth. There is also a small plantation, about half an acre in area, near Arles, in the marshland of the Rhône delta. The volume of timber is enormous, being equivalent to 13,200 cubic feet per acre, or an annual increment of 240 cubic feet per acre.

The Chinese swamp cypress requires a warmer climate than either of the two species of *Taxodium*.

Both *Glyptostrobus* and *Taxodium*, owing to their peculiar root-system are valuable species for binding loose and treacherous soils, such as occur on the banks of rivers and irrigation canals.

Forestry in the Andaman Islands in 1924-25.

MASON L. Chief Forest Officer. *Report on Forest Administration in the Andamans for the year 1924-25*, Calcutta, 1926, pp. 3-4.

The natural regeneration in the area worked over is generally good, regeneration of such species as *Terminalia bialata*, *Terminalia procera*, *Canarium euphyllum* and *Sterculia campanulata* being especially plentiful. Regeneration of Padauk (*Pterocarpus dalbergioides* Roxb.), although plentiful, is quickly suppressed unless tended and completely freed from overhead cover.

In the evergreen forests while the proportion of "Gurjan" (*Dipterocarpus alatus* Roxb. and *D. turbinatus* Gaertn.) in the pole stage is generally satisfactory, little or no regeneration of Gurjan in the seedling or sapling stage has been observed. It would appear that the condition of the vegetation in these forests has undergone some recent change, rendering it unsuitable to the regeneration of Gurjan.

As regards artificial reproduction, after 144 acres of the Brigade Creek

1898 plantation had been cut over during the year, 108 acres were replanted with *Brugiera gymnorhiza* Lam. Near Bumlitani 60 acres were planted with the same species.

Thinnings were carried out in the following plantations: 1903-1911 Padauk (*Pterocarpus dalbergioides* Roxb.), 1913 teak with exotics, 1914 teak with Padauk, and 1923 Padauk, up to a total of 541 acres.

The total area of plantations at the beginning of the year was 4153.5 acres, and at the close of the year 4177.5 acres.

PLANT PROTECTION

DISCOVERIES AND CURRENT EVENTS IN WORLD PHYTOPATHOLOGY

Canada : General Notes on Diseases recently recorded (1).

Tomato mosaic is fairly uniform in the Niagara peninsula ; in one planting 30-40 per cent. of the plants show infections.

Apple scab is a serious factor in many orchards.

Raspberry mosaic and leaf curl are appearing in a severe form at this time (August).

Rhizoctonia caused considerable injury in plantings of early potatoes.

Puccinia graminis is prevalent to a considerable extent in some sections of the hard, red, spring wheats. Cool nights keep down the development of this rust in Marquis wheat. Early sown Ruby is practically out of danger.

The eradication of barberry (*Berberis vulgaris*) throughout the Canadian West is practically completed.

Phytophthora blight of potatoes was observed in various localities in July.

The crops are unusually good and generally sound.

Belgian Congo : New or particularly interesting Diseases (2).

Colletotrichum sp. on the leaves of the silk cotton tree (*Eriodendron anfractuosum*) noted at Eala, Mongobèle and Mushie. The variety "Randoe Lanang" is very resistant.

Parodiella prisporioides on *Crotalaria retusa* in the experimental plots at Eala.

Sclerotium Rolfsii on *Crot. usaramoensis* and on *Crot. striata* in experimental plots at Eala.

(1) Communication from the official correspondent to the Institute, Mr. H. T. GROSSOW, Dominion Botanist, Central Experimental Farm, Ottawa

(2) Communication from the official correspondent to the Institute, Dr. Pierre STANER, Director of the Mycological Laboratory at Eala.

Only *Crot. anagyroides* is unaffected by these two diseases.

Pestalozzia funerea var. *discolor* on *Cryptomeria* and *Araucaria* in the collections at Eala.

Bacillus phytophthorus or *Bac. caulivorus* and *Bac. Solanacearum* on potatoes at Eala.

Septoria Apii on celery at Eala.

It is to be remarked that the last three diseases are the same as attack these plants in Europe. It is therefore probable that they have been imported at the same time as the seeds.

Italy : Phytopathological Notes (1).

During August 1927, the " R. Osservatorio di Fitopatologia " of Turin has noted somewhat widespread bacteriosis of tomato fruits in Piedmont. The same disease has also been verified by the " R. Stazione di Patologia vegetale " of Rome on samples sent from Tuscany.

Serious attacks of *Stigmatea Mespili* on wild pear and quince have also been observed in Piedmont.

The greatest loss to the countryside has been due to hail and violent storms in northern Italy and to drought in southern Italy and along all the Adriatic coast.

Serb, Croat and Slovene State : A New Insect Pest in Dalmatia (2).

A new insect pest in Dalmatia is *Psila rosae* Fab. In the autumn of 1926 many carrot and celery plantations were attacked by the larvae of this insect, which bored holes in the underground parts of the stalks, thus completely destroying them.

In the early days of March 1927 the writer succeeded in breeding out the adult.

Switzerland : Plant Pests in Ticino, during the second Quarter of 1927 (3).

Vines. — Fairly vigorous attack of the beetle *Anomala oblonga* on vines on the right bank of the Ticino.

Horticultural Plants. — Reappearance of *Icerya purchasi* on horticultural plants in Ticino.

(1) Communication from the " R. Stazione di Patologia vegetale di Roma ", official correspondent to the Institute.

(2) Communication from the official correspondent to the Institute, Mr. P. NOVAK, Chief of the Entomological Station, Split.

(3) Communication from the official correspondent to the Institute, Dr. H. FAES, Director of the " Station fédérale d'essais viticoles ", Lausanne.

VARIOUS QUESTIONS RELATING TO PLANT PROTECTION IN THE DIFFERENT COUNTRIES

Algeria : Swarms in Flight and Breeding Places of *Doclostaurus maroccanus* during the Month of July, 1927 (1).

1. — On the 7th July swarms in flight were observed at El Achir and at the M'Zita, Ouled Ali and Mansourah douars and at the boundary of Kessabia douar of M'Sila (Mixed Commune of Les Bibans).

2. — Breeding places were observed at the boundary of Les Bibans, at Ksour douar (Commune of Les Maadids) on 25 and 26 July. Considerable damage in gardens.

3. — Swarms in flight were noted in the El Morra, Taguedide, Megh-nine, Oued Djenane, Serdoun and Béni Inthacen douars of the mixed Commune of Aumale, about 9 July. Fairly considerable damage was done to the crops.

4. — At Berthelot (Department of Oran) some very considerable swarms in flight came from Possénégre and Lemcen. About 15 hectares were occupied by the locusts which only did very little damage as the cereal crops had already been harvested. Only gardens suffered.

Attempts to destroy them with flame-projectors were made on large swarms.

5. — At the beginning of the month swarms in flight were noted at the place called " Kès-Kès " near the Tiaret-Aflou road (Mixed Commune of Aflou).

Guadeloupe : Crop Pests and Diseases (2).

1. — From the point of view of animal parasitology the crops of Guadeloupe, speaking generally, are not attacked by dangerous enough enemies to attract the attention of agriculturists. Our crops have never suffered from those formidable epidemics which reduce to nil the harvests of one or several years. They are rather subject to endemic evils causing a gradual daily deterioration in local production. The worst feature is that this condition leaves agriculturists indifferent ; they are satisfied with their poor return, and make no attempt to find the reason of their low production and to remedy it.

(1) Communication from the Governor General of Algeria to the President of the International Institute of Agriculture.

(2) Communication from the official correspondent to the Institute, Mr. A. BUFFON, Chief of the Agricultural Service of the Government of Guadeloupe and Dependencies, Basse-Terre.

Before dealing with our chief crops we propose to call attention to some of the enemies which attack most of our agricultural products.

R a t s are a serious trouble throughout the country; they attack nearly all our products, especially sugar-cane, cacao pods, coconut, maize, cotton bolls and cassava. In certain coconut plantations they destroy up to two thirds of the nuts. They have no serious enemy to act as a check. The mongoose which was introduced for the purpose does not seem to attack them effectively, preferring to look for more easily caught prey especially game.

The small "Iles des Saintes" suffered a serious invasion of *l o c u s t s* in 1926. The crops most affected were: maize, cotton, pigeon pea (*Cajanus indicus*), French beans. The loss suffered was considerable. The agricultural Service was only advised of the attack of the locusts long afterwards and could not establish to what species they belonged.

C e r t a i n a n t s do serious damage to crops, especially a great black ant which attacks nearly all underground tubers (sweet and ordinary potatoes, yams). Sometimes they are found round the roots of certain plants in large numbers without showing exactly what their effect has been. Again they often hollow out tunnels or enter those already made in the trunks and branches of trees. They attack certain fruits already pierced by other insects or by birds. Their seed eating propensities are often a source of serious annoyance to market gardeners.

S c a l e i n s e c t s do serious damage to certain of our crops, especially to cotton, coffee, coconut, lemons and pigeon pea. They are often accompanied by ants and by "sooty mould" which increase their harmfulness.

Concise notes follow on our chief crop enemies.

S u g a r C a n e. -- The chief enemy of sugar cane in Guadeloupe is the caterpillar of *Diatraea saccharalis*. Its attacks however have never been sufficiently widespread to ruin the whole harvest. Even on the big estates, which are generally kept in the best order, there are so many other causes of reduced crop that this particular one passes unnoticed.

D. saccharalis has here two recognized natural enemies: a Hymenopterous parasite of the eggs (probably *Trichogramma praetiosa*), and a *Cordiceps*, parasitic on the caterpillars.

Other insects harmful to sugar cane are: *Diaprepes abbreviatus* and *D. famelicus*, which we observed in pretty serious numbers round about Capesterre, and white root worms (*Cyclocephala*). *Pseudococcus calceolariae*, sometimes found in considerable quantities on the roots or in the leaf sheaths, does not seem to do serious damage.

C o f f e e. -- The leaf miner (*Cemiotoma coffeella*) is always the most dangerous insect. Some landowners are beginning to show concern and are using snare-lamps for its control. Such a practice can only be really effective when it becomes general.

A plant-louse, a scale insect and certain ants are the most important enemies of the coffee plant.

C a c a o. -- Here and there attacks of *Steirastoma* are noticeable.

B a n a n a. — Rather serious damage is done by a large white grub (*Ligyris*?) and sometimes by the attacks of *Sphenophorus*.

C o t t o n. — *Dysdercus delauncyi* is generally the worst enemy of cotton, though we did not find it in serious numbers either at La Désirade or at Les Saintes. In the last named locality cotton suffers very serious damage especially from a white scale insect. This chiefly attacks the old plants and badly developed shrubs. Proper plantation management already seems a most effective control measure.

M a i z e. — This crop is always affected by the caterpillars of *Laphygma frugiperda* and of *Diatraea saccharalis*. We sometimes found inside the bracts of the young cobs large colonies of associated insects including Dipterous larvae, numerous plant-lice, and ants.

C a s s a v a. — Throughout Guadeloupe the cassava is attacked by a small caterpillar, which destroys the young terminal growths of the main stem and of the branches, but never seems to do very serious damage.

The caterpillars of Noctuae, which destroyed several dozen hectares of cassava in the neighbourhood of Capesterre in 1924, were not reported in 1926.

M a r k e t G a r d e n i n g a n d v a r i o u s C r o p s. — The following have been noted by us: *Picris virginica* on cabbage and radish; *Protoparce sexta* on pepper and tomato; *Chloridea virescens* on pigeon pea.

The last named suffers throughout the country from the attack of a scale insect. *Neczara viridula* seriously infests tomato leaves. The Jasmine tree is regularly infested at Basse-Terre by huge caterpillars of *Pseudosphinx tetrio*. We noted a case in which the roots of a papaw tree were attacked by a Nematode with consequent tuberosity formation of 1 cm. — 1.5 cm. in diameter. Sweet potatoes are seriously attacked by the caterpillar of a sphingid.

II. — The same general observations made regarding the entomological situation apply here also. The diseases are principally endemic. The most serious trouble is, generally speaking, insufficient care in management, inadequate manuring, bad drainage, acid soil. Diseases of the roots are consequently frequent in all parts.

Before dealing with our chief crops reference will be made to certain Phanerogamic parasites harmful to such permanent crops as coffee, lemon and orange trees, particularly in wet districts. They are: *Loranthus uniflorus*, *Peperomia nummularifolia*, *Tillandsia* spp.

In dry districts trees are often attacked by *Tillandsia utriculata*.

S u g a r c a n e. — Root disease occurs most frequently and is most widespread. It is chiefly caused by *Marasmius Sacchari*, but always in association with other fungi.

The stalks pierced by "borers" are often attacked by *Colletotrichum falcatum*.

Mosaic disease and gummosis both rampant in nearly all the Antilles are as yet unknown in Guadeloupe.

C o f f e e a n d C a c a o. — These crops are always badly attacked by root diseases (*Rosellinia* spp.) Owners are showing concern, but are

not always taking proper control measures. The disease spreads in patches and chiefly attacks coffee, cacao, inga, avocado pear, lemon trees. It is much the most important coffee disease in Guadeloupe.

Coffee is also attacked by *Cercospora coffeicola*, *Sphaerella coffeicola*, *Glocosporium coffeanum*.

Cacao plants, especially when suddenly exposed, are subject to desiccation of their heads or "Die-back". Mould of the pods (*Phytophthora Faberi*) and "Anthracnose" are found but do not cause serious damage.

Cotton. — "Angular leaf spot" (*Bacterium* [*Pseudomonas*] *Malvacearum*) and "Rust" (*Kuehneola Gossypii*) are often found, and cause considerable damage.

The drying up of the bolls is fairly general and fairly serious, chiefly in crops attacked by *Dysdercus delauneyi*.

Various Crops. — In one banana crop we noted numerous cases of root rot. The disease seemed to be caused entirely by bad soil conditions, the ground being too clayey and compact.

Gummosis, showing a very abundant secretion, was noted on mahoganies in a public square.

Syria : Experiments on Locust Destruction (1).

The following are the results of locust destruction experiments carried out between 27 March and 2 April, 1927, by means of pyrethrum soap.

No. 1 carried out at Jaadeh in Djezireh. — A plot of land of 50 square metres, containing young locusts aged 24 hours, was sprayed with 5 litres of 2 % pyrethrum soap solution. After 40 minutes 70 % of the insects present on the plot were found to be dead.

As the plot was not isolated it was possible for those coming from neighbouring plots to enter after the spraying.

No. 2. Same locality. — An isolated plot of ground of 150 square metres, containing 5 day old locusts was sprayed with 10 litres of a 3 % pyrethrum soap solution. An hour afterwards 80 % were found to be dead.

No. 3 carried out at Massoudieh in Djezireh. — An isolated plot of ground of 150 square metres containing 7 day old locusts was sprayed with about 12 litres of a 4 % solution of pyrethrum soap.

An hour afterwards 90 % were found to be dead.

No. 4 carried out at Tache Ataene in Chamié. — An isolated plot of ground of 200 square metres, containing 8 day old locusts, was sprayed with 15 litres of a 4 % pyrethrum soap solution. An hour and a half afterwards 70 % were found to be dead.

No. 5. Carried out at El Kobbé, in Djezireh. — An isolated plot of ground of 700 square metres, containing 10 day old locusts, was sprayed with

(1) Communication from the official correspondent to the Institute, Mr. Raphaël HALLAGE, Inspector of the Consultative Commission of Epiphyties attached to the High Commission of the French Republic in Syria and Lebanon, at Damascus.

48 litres of a 5 % pyrethrum soap solution. Half an hour after spraying 95 % were found to be dead.

These various trials took place at different dates at about 6 a. m. at the moment when the young locusts were still torpid from the night cold.

* * *

Between 27 March and 2 April, 1927, trials of locust destruction by means of arsénison were carried out with the following results : —

No. 1 carried out at El Kobbé, in Djezireh. — A plot of ground containing 3 days old locusts was sprinkled with about 1 kg. of arsénison. The operation took place about 5 p. m. At 8 a. m. the next day the plot was seen to contain large numbers of dead red-coloured locusts.

As the trial plot bounded an area containing young locusts, which could pass on to the plot, no mortality percentage could be established.

No. 2, carried out at Jaadeh, in Djezireh. — An isolated plot of 250 square metres, containing 8 day old locusts, was sprinkled with 1 ½ kgs. arsénison at 8 a. m. Twenty four hours afterwards not a single live insect could be discovered : mortality 100 %.

No. 3, carried out at El Kobbé in Djezireh. — On 29 March a quantity of arsénison less than 1 kg. was sprinkled on the track followed by a swarm of 10 day old locusts. At 9 a. m. on the next day there was a heap of dead insects on the track followed by them ; on the day after the number of dead was still greater.

This proves that arsénison can be successfully used on locusts in waterless desert regions.

LEGISLATIVE AND ADMINISTRATIVE
MEASURES

Tyrol (Austria). — The Law No. 32 of 18 February, 1927, passed by the "Landtag" of the Tyrol came into force on the 8 June, 1927; it regulates the control of diseases and pests of cultivated plants, including weeds but excluding game.

It imposes on owners the duty of taking preventive measures and of employing all means of control at their personal disposal, for keeping their cultivated lands free of diseases and pests and also carrying out, either individually or jointly, all the measures enjoined by the authorities for protection of plants.

Owners are also obliged to report immediately to the competent authorities the appearance of every disease or pest, to furnish accurate information regarding the crops infested and to give free access to their properties to representatives of the authorities, for purposes of inspection and of application of the means of control adopted for the whole Commune.

The Mayor personally superintends the carrying out of these measures by the owners; he has the right to require the execution of certain obligatory work and to mobilize the members of the community with this object. The mayoralty can fix rewards for the collection of certain pests; such rewards will be paid out of the funds of the community.

The district political authorities are charged with the superintendence of the carrying out of measures for plant protection. They have the right to make obligatory certain preventive measures and certain means of control if the conditions require it. If the infection goes beyond the boundaries of the district, these authorities should make arrangements with the authorities of the neighbouring district for undertaking control in common and, in case of necessity, authorities should inform the central Government.

The Government is empowered, in this case, to take the necessary measures for guaranteeing the execution of the present Law, to issue regulations with respect to it, and especially to establish a control over nurseries, seed stores and other similar establishments which may easily become a source of propagation of diseases and pests. They have further the right of declaring infected districts and lands on which certain diseases and pests have broken out and of prohibiting access to such districts.

The district authorities, in case of urgency, can order the same measures.

Generally, the expenses for the protection of plants must be borne by the owners. The Mayor has the right of levying a contribution towards these expenses on citizens; they have however the right of appeal to the authorities whenever they consider that they are unfairly burdened by such exactions.

On common property the measures should be carried out by joint action of the community.

Provisions relating to the protection of plants against diseases and pests if involving technical measures should be decreed by the authorities of the district, only after consultation with one or more experts, and the approval of the Tyrol Agricultural Council should be obtained for the carrying into effect of prophylactic measures. Infraction of the Law is punishable by fine up to 200 sch. which, in case of repetition or of aggravating circumstances, may be doubled, or changed to imprisonment for a fortnight to two months.

This Law does not in any way amend the Forest Law of 3 December, 1852 (*R. G. Bl. Nr. 250*) referring to damage caused by insects, nor the existing regulations for grape phylloxera control, nor the general Law of 18 June, 1899 (*L. G. Bl. Nr. 34*) with regard to the protection of birds useful to agriculture.

The Law of 16 May, 1874 (*L. G. Bl. Nr. 34*) relating to the steps to be taken for the protection of field products, fruit trees and vines against harmful insects is at the same time abrogated. (*Landes-Gesetz- und Verordnungsblatt für Tirol*, 8. Juni 1927, Jahrg. 1927, VIII. Stück, S. 55-58).

Scotland. — By Order of the Board of Agriculture for Scotland, for the purpose of preventing the introduction of pests of the elm tree including *Graphium Ulmi* and *Micrococcus Ulmi*, the landing in Scotland from any European country other than England and Wales, Ireland, the Channel Islands and the Isle of Man, of any living elm tree is prohibited from and after 1 February, 1927. (*Statutory Rules and Orders, 1927, No. 31*. S. 3).

Destructive Insect and Pest, Scotland. The Importation of Elm Trees (Prohibition) (Scotland) Order of 1927. Dated January 15, 1927.

* * By Order of the Board of Agriculture for Scotland, for the purpose of preventing the introduction of the Potato Moth (*Phthorimaea operculella*, Zell.), the landing in Scotland of any potatoes grown in Malta is prohibited unless each consignment is accompanied by a certificate as prescribed in the third Schedule to the Destructive Insects and Pests (Scotland) Order of 1922. (*Statutory Rules and Orders, 1927, No. 578*. S. 31).

Destructive Insect and Pest, Scotland. The Importation of Potatoes (Malta) (Scotland) Order of 1927, Dated June 21, 1927.

* * By Order of the Board of Agriculture for Scotland, for the purpose of preventing the introduction of the Potato Moth (*Phthorimaea operculella*, Zell.), the landing in Scotland of any potatoes grown in the Canary Islands is prohibited from and after July 1 unless each consignment is accompanied by a certificate as prescribed in the third Schedule to the Destructive Insects and Pests (Scotland) Order of 1922. The Importation of Potatoes (Canary Islands) (Scotland) Order of 1927, dated June 7, 1927 is thereby revoked. (*Statutory Rules and Orders, 1927, No. 606*. S. 33).

Destructive Insect and Pest, Scotland. The Importation of Potatoes (Canary Islands) (Scotland) Order of 1927 (No. 2). Dated July 1, 1927.

France. — The Law of 3 June, 1927, extends to the case of dangerous animals certain provisions of the Law on rural police which relate to crops, and provides in certain cases for the official carrying out of control measures by a "Syndicat de défense".

Paragraph 1 of article 76 of the Law of 21 July, 1898 (Code rural, livre III, titre 1^{er}, chap. 4) is amended as follows:—

"The Prefects prescribe the necessary measures for checking or preventing damage to crops by insects, cryptogamic parasites and any other injurious animals or plants, whenever such damage assumes or may assume the character of an invasion or pest".

(The rest of article 76 unchanged).

Article 80 of the Law of 21 June, 1898 (Code rural, livre III, titre 1^{er}, chap. 4) is replaced by the following provisions:—

"When the removal of caterpillars, the destruction of injurious insects, or the destruction of cryptogamic parasites, other injurious animals or plants, has to be effected on property belonging to the State, to Departments or to Communes, and has not been effected within the time prescribed, such operations will be carried out by Order of the Prefect at the expense of the owners".

The law of 21 June, 1898 on rural police is thus amended:—

"Art. 79 bis. — When the damage to crops, caused by insects, cryptogamic parasites and any other injurious animals or plants, is found to be so serious as to necessitate the employment of urgent measures of general application, the Prefect will, in the region affected, order the destruction of such pests by means of a "Syndicat de défense" constituted under the Law of 21 March, 1920. The "Syndicat" will undertake to act under the technical supervision of the competent Service of the Ministry of Agriculture, and to advance the expenses necessary for the organisation of the control of the pest.

"Whenever a "Syndicat" has been formed the following provisions will be applied:—

"The Minister of Agriculture on the proposal of the Prefect, and after notifying the "Syndicat" and the Director of Agricultural Services, defines, by Decree, the region declared infested.

"When the application, by private owners, of the processes of destruction prescribed by Prefectorial Decree under Art. 76 of the present Law, has not been successful or has not been carried out, the Prefect issues a Decree calling upon and authorizing the "Syndicat" to proceed officially, after the lapse of two clear days, to the work of destroying the parasite within the limits laid down.

"The parties concerned must allow the officers of the "Syndicat" free access to their lands.

"The State, the Departments, Communes, public or private bodies of any kind, are subject to the same obligations as private owners.

"The expenses incurred in the carrying out of these measures, are

divided by the Prefect among the farmers in the same proportion as the land tax on the unbuilt land of each of the parcels cultivated by them and in respect of which the "Syndicat" has taken action.

"The "Syndicat" notifies each farmer of his share of the expenditure.

"In default of payment made directly to the "Syndicat" by the parties concerned within a period of three months, recovery is effected, as in the case of direct taxes, on a list approved and signed by the Prefect". (*Journal officiel de la République Française*, Paris, 4 juin 1927, LIX^e année, n^o 130, p. 5826).

Italy. — By the Ministerial Decree of 15 July, 1927 — the prohibition remaining in force of the importation of potatoes from any country, confirmed by article 8, letter *e*) of the Ministerial Decree of 3 March, 1927, relating to the importation of live plants, parts of plants, seeds and other plant products subject to phytosanitary control (see No. 3 of this periodical) — the importation of potatoes into the Kingdom may be allowed, as an exceptional measure, for the agricultural season of 1927-28, if exclusively intended for use as seed. Power to grant to legally constituted agricultural bodies permission to import seed potatoes is delegated to the Royal Station of Plant Pathology at Rome, which will make the necessary enquiries for ascertaining the health conditions of the potatoes, including the inspection of the crops of origin in situ, will indicate in foreign countries localities from which importation may be allowed, and will fix, in agreement with the Regional phytopathological Observatories of the Kingdom the rules under which the consignments should be admitted by the Customs authorized for importation. (*Gazzetta ufficiale del Regno d'Italia*, Roma, 5 agosto 1927, anno 68^o, n. 180, pp. 3179-3180).

* * By Law No. 1272 of 23 June, 1927, the National Institute for Exportation is authorized to institute a national exportation mark for fruit, fresh and dried, citrus fruits and vegetables intended for export.

The actual use of the mark by authorized exporters is subject, *inter alia*, to the condition that, in the case of products submitted to phytosanitary inspection, these shall be found to be perfectly healthy and immune from diseases and pests by the competent delegate of the Service of Plant Protection.

Inspection of goods bearing the mark will be carried out in the Kingdom and abroad, by Inspectors appointed by the National Institute for Exportation. Persons attached to the Service of Phytopathological Inspection, under the Ministry of National Economy, may also act as Inspectors. Such persons, so far as relates to inspection for the purposes of the present Law, will report directly to the National Institute for Exportation. (*Gazzetta ufficiale del Regno d'Italia*, Roma, 6 agosto 1927, anno 68^o, n. 181, pp. 3190-3192).

* * Following the presence of grape phylloxera [*Phylloxera vastatrix*] which has been determined in the Communes of Benenello and Verduno in the Province of Cuneo, of Pienza in the Province of Siena, of Argenta, Cento, Portomaggiore and Vigarano in the Province of Ferrara, a Decree of 31 July, 1927 has extended to the area of these Communes the rules contained in art. 10-14 of the Regulation No. 1099 of 13 June, 1918, relating to the exportation of such materials as are indicated in Nos. 1, 2, 3, and 4 of art. 10 of this Regulation. (*Gazzetta ufficiale del Regno d'Italia*, Roma, 9 agosto 1927, anno 68^o, n. 183, p. 3231).

* * A provincial "Federazione di Consorzi" for control of diseases and pests of the olive tree has recently been constituted under the aegis of the local "Cattedra ambulante d'Agricoltura" in the province of Grosseto. Control measures against the "olive fly" [*Dacus oleae*] are obligatory for all. (*Rivista di Agricoltura*, Roma, 1927, anno XXXII, n. 28, p. 447).

RECENT BIBLIOGRAPHY

Atkinson, D. J. *Hoplocerambyx spinicornis* - An important pest of sal. - *Forest Bulletin* No. 70, 1926. (*Entomological Series*), Calcutta, 1927, 24pp, 5pl.

[Sal = *Shorea robusta*].

Ballou, G. H. and Levis, I. P. Standard and dilute sprays in apple scab prevention. *American Fruit Grower Magazine*, Chicago, Ill., 1927, vol. XLVII, no. 3, pp 28-29.

Bodenheimer, F. S. and Klein, H. Z. *Zeuzera pyrina* L. Its biology in Palestine and its control. *The Zionist Executive, Agricultural Experiment Station and Colonisation Department, Extension Division, Circular* 13. Tel-Aviv, Palestine. 1927, 20pp, 5figs.

[In Hebrew, with an English summary].

Britton, W. E. Organization of a co-operative campaign against the Asiatic beetle. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol 20, no. 2, pp. 359-361.

[*Anomala orientalis* Waterhouse].

Brunetti, F. L'*Exoascus deformans* e la conservazione delle frutta. *Il Lavoro d'Italia Agricola*, Roma, 1927, anno I, n. 17, p. 4

Buckhurst, A. S. Notes on bulb mites and eelworms. *The Journal of the Ministry of Agriculture*, London, 1927, vol XXXIV, no 1, pp 4-6, 1pl.

[*Rhizoglyphus cchinopus*, *Tylenchus dipsaci*].

Burgess, A. F. and Crossman, S. S. The satin moth, a recently introduced pest. *United States Department of Agriculture, Department Bulletin* No. 1469. Washington, D. C., 1927, 22pp., 5figs., 1coul. pl.

[Satin moth = *Stilpnotia salicis* L.].

Clausen, CURTIS P. and King, J. L. and Teranishi, CHO. The parasites of *Popillia japonica* in Japan and Chosen (Korea) and their introduction into the United States. *United States Department of Agriculture, Department Bulletin* No. 1429. Washington, D. C., 1927, 55pp., 35figs., 1coul. pl.

[*Centeter cinerea* Aldrich, *Eutritropsis javana* Townsend, *Ochromegenia ormoides* Townsend,

parasites of the adult; *Prosema siberita* (Fabricius), *Dexia ventralis* Aldrich, *Campsomeris annulata* (Fabricius), *Tiphia popillivora* Rohwer, *T. venalis* Rohwer, *T. koreana* Rohwer, parasites of the larva; *Craspedonotus tibialis* Schaum, predaceous species].

Cutright, C. R. Paradichlorobenzene against the black peach aphid, *Anuraphis persicae-niger* Smith. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol.20,no.2,pp.250-253,fig.11.

deHong, E. R., Knight HUGH and Chamberlin, JOSEPH. C. A preliminary study of petroleum oil as an insecticide for citrus trees. *Hilgardia*, Berkeley, California, 1927, vol.2,no.9,pp.351-384,fig.1-4.

Delacroix, GEORGES. Maladies des plantes cultivées. Maladies non parasitaires. (Encyclopédie Agricole). Paris, J.-B. Baillière et fils, 1927. 415p..56pl.

Delassus, Brichet, Lepigre, Balachowsky. Les ennemis des cultures fruitières en Algérie et les moyens pratiques de les combattre. *Alger*, 1927, 200p, 107fig.

Demaree, J. B. and Cole, J. R. Dusting with monohydrated copper sulphate and lime for control of pecan scab. *United States Department of Agriculture, Department Circular 412*, Washington, D. C., 1927, 8pp.

[Pecan scab = *Fusicladium effusum* Winter].

Dohanian, S. M. Some of the important forest insects of Western Europe. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol. 20, no.2,pp.310-316.

[*Portheia dispar* L., *Nygmia phaeorrhoea* Don., *Bombyx neustria* L., *Tortrix viridana* L., *Thaumetopoea (Cnethocampa) pityocampa* Schiff., *Lophyrus (Diprion) pini* L.].

Doucette, CHARLES F. The tulip or iris aphid in Santa Cruz County, California. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol.20,no.2,pp.431-432.

[*Anuraphis tulipae* Boyer de Fonscolombe].

Driggers, BYRLEY F. Calcium cyanide as a control for the cranberry root worm on cultivated blueberries. *Journal of Economic Entomology*, Ge-

neva, N.Y.. 1927. vol.20,no.2,pp.267-270.

[Cranberry root worm = *Rhabdopierus picipes* Oliv.].

Dufrénoy, J. Observations cytologiques sur une hadromycose des melons. *Comptes rendus des séances de la Société de Biologie et de ses filiales*, Paris, 1927, tome XCVI, n°14,p.1104-1107,fig.1-3.

[Bacteria, *Verticillium* sp., *Fusarium Solani* var. *cyanus*].

Eyer, J. R. Tests of some recently developed insecticides in control of the grape leafhopper and oriental fruit moth. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol.20, no. 2,pp.253-260.

[Grape leafhopper = *Typhlocyba comes* Say; Oriental fruit moth = *Laspeyresia molesta*, Busck].

Fenton, F. Q. and Dunnam, E. W. Winter survival of the cotton boll weevil at Florence, S. C. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol.20,no.2,pp.327-336.

[*Anthonomus grandis*].

Ferraris, F. Trattato di Patologia e Terapia vegetale. ad uso delle Scuole di Agricoltura. Parassiti vegetali delle piante coltivate od utili. 3^a ediz. completamente riveduta. Vol. II. Milano, U. Hoepli, 1927, pp VIII-624, 103figg., 3tav.

Feytaud, J. La nicotine. *Revue de Zoologie agricole et appliquée*. Bordeaux. 1927. 26^e année, n° 2. pp.17-30

Fox, HENRY. The present range of the Japanese beetle. *Popillia japonica* Newm., in America and some factors influencing its spread. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol.20,no.2,pp.383-391, fig.16-17.

Friend, R. B. The Asiatic beetle (*Anomala orientalis* Waterhouse). *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol.20,no.2,pp.362-364.

Gadd, C. H. The relationship between the Phytophthorae associated with the bud-rot diseases of palms.

Annals of Botany, London, 1927, vol. XLI, no. CLXII, pp. 253-280.

Geissler, A. Das "Bioklimatische Gesetz" von Hopkins und der Versuch seiner Nutzbarmachung für die Landwirtschaft. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin. 1927. 7. Jahrg., Nr. 4, S. 35-36; Nr. 5, S. 43-44.

Grassé, PIERRE P. A propos d'une invasion de vers gris. *Le Progrès Agricole et Viticole*, Edition de l'Est-Centre, Montpellier, 1927, 48^e année, n° 21, p. 509-512.

[Caterpillars of *Agrotis exclamations* (?) harmful to the vine at Candillargues].

Hamlin, J. C. and Reed, W. D. Insect revival after fumigation. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol. 20, no. 2, pp. 400-428.

[*Oryzaephilus surinamensis*, *Plodia interpunctella*].

Hinds, W. E. and Spencer, HERBERT. Airplane dusting for sugarcane borer control in Louisiana. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol. 20, no. 2, pp. 352-358.

[*Diatraea saccharalis* Fabr. var. *crambuloides* Grote].

Hood, CLIFFORD E. The quantity of fish oil to use as an adhesive in lead arsenate mixtures. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol. 20, no. 2, p. 428.

Houser, J. S. *Ellopiia athasaria* Walk., a looper attacking hemlock. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol. 20, no. 2, pp. 299-301.

Huber, L. L. and Neiswander, C. R. The European corn borer and ecological habitats. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol. 20, no. 2, pp. 337-341, fig. 13.

[*Pyrausta nubilalis* Hüb.].

Institut International d'Agriculture. Documentation pour la réunion de la Conférence internationale pour la protection des plantes. Rome, 1927, 22p.

[Contains the following official documents: Acte final de la Conférence internationale de Phytologie, fait à Rome le 4 mars 1914; Décision n° 29 de la VIII^{ème} Assemblée générale de l'Institut In-

ternational d'Agriculture (avril 1926) relative à la Conférence internationale pour la protection des plantes; Rapport de la Commission internationale des experts pour la protection des végétaux; Projet d'une Convention internationale pour la protection des végétaux; Projet d'une Convention internationale pour la protection des végétaux modifiant l'Acte final de la Conférence internationale de Phytologie du 4 mars 1914; Proposition de l'Indochine; Texte de l'Acte final établi à Rome le 4 mars 1914, avec les modifications approuvées par la Conférence préliminaire pour la protection des plantes, tenue à Buenos Aires du 15 au 17 juin 1926 avec la participation des Délégués des Gouvernements du Brésil, du Paraguay, de l'Uruguay et de l'Argentine].

Johnson, J. PETER. Soil treatment and scouting for the control of the Asiatic beetle. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol. 20, no. 2, pp. 373-376.

[*Anomala orientalis* Waterhouse].

King, J. L., Allen, H. W. and Hallock, H. C. The present status of the work on the parasites of *Popillia japonica* Newman. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol. 20, no. 2, pp. 365-373.

[*Centeter cinerea* Ald., *Tiphia popillavora* Roh., *Prosema siberita* Fab., *Dexia ventralis* Ald., *T. ventralis* Roh., etc.].

Libutti, D. Norme per combattere efficacemente la peronospora della vite. *L'Istria Agricola*, Parenzo, 1927, anno VII (nuova serie), n. 9, pp. 199-204.

McGregor, E. A. and Newcomer, E. J. The true identity of the citrus mite. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol. 20, no. 2, p. 429.

[*Paratetranychus citri* McG.].

McLaine, L. S. and Crawford, H. G. The status of the European corn borer in Canada (1926). *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol. 20, no. 2, pp. 341-344.

[*Pyrausta nubilalis* Hüb.].

Meier. Die Kräuselkrankheit der Pfirsichbäume. *Schweizerische Obst- und Gartenbau-Zeitung*, Münsingen, 1927, 29. Jahrg.-40. Jahrg., Nr. 7, S. 111.

[*Exoascus deformans*].

Molz, E. Eine neue und gefährliche Zuckerrübenkrankheit. Die Mosaikkrankheit der Zuckerrübe. *Die Umschau*, Frankfurt a. M., 1927, 31. Jahrg., Heft 15, S. 293-296, Fig. 1-2.

- Morris, LAVAL, S.** Spraying calendar for Rocky Mountain area. *American Fruit Grower Magazine*, Chicago, Ill., 1927, vol. XLVII, no. 2, pp. 36-37.
- Murphy, PAUL A. and McKay, ROBERT.** Investigations on the leaf-roll and mosaic diseases of the potato. *Journal of the Department of Lands and Agriculture*, Dublin, 1927, vol. XXVI, no. 4, pp. 295-305, fig. 1-7.
- Neal, D. C.** Plant wilt-resistant tomatoes. *The Quarterly Bulletin of the State Plant Board of Mississippi*, A. and M. College, Mississippi. 1927, vol. 6, no. 4, pp. 14-18, fig. 1-3.
[Tomato wilt = *Fusarium Lycopersici*].
- Neal, D. C.** Strawberry leaf-spot and its control. *The Quarterly Bulletin of the State Plant Board of Mississippi*, A. and M. College, Mississippi, 1927, vol. 6, no. 4, pp. 23-24, fig. 6.
[*Mycosphaerella Fragariae*].
- Neiswander, C. R. and Huber, L. I.** The European corn borer in weeds and truck crops in Ohio. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol. 20, no. 2, pp. 344-351.
[*Pyrausta nubilalis* Hubn.].
- Newcomer, E. J.** Shall we spray with oil? *American Fruit Grower Magazine*, Chicago, Ill., 1927, vol. XLVII, no. 2, pp. 9, 27, 1 fig.
- Nicholson, C.** The golden - 8 moth (*Plusia moneta*). *The Gardeners' Chronicle*, London, 1927, vol. LXXXI, third series, no. 2107, pp. 341-342, fig. 164.
- Ottavi, E.-Gabbotto, I.** Contro le malattie e gli insetti delle piante agrarie. Terza edizione. (Biblioteca Agraria Ottavi, vol. XCII). Casale Monferrato, Casa Editrice Fratelli Ottavi, 1927, XVII-365pp., 188 figg.
- Pagliano.** La mouche des fruits (*Ceratitis capitata* Wied. 1824). *Bulletin de la Société d'Horticulture de Tunisie*, Tunis, 1927, 25^e année, n° 226, p. 79-93, fig. 1-2.
- Pagliano.** Une punaise des fruits, *Oxyarenus lavaterae* F. *Bulletin de la Société d'Horticulture de Tunisie*, Tunis, 1927, 25^e année, n° 223, p. 28-31, 1 fig.
- Pagliano, T.** Les parasites des grains récoltés. Conférence faite à la Société des Agriculteurs de la Tunisie le 12 janvier 1927. *La Tunisie Agricole*, Tunis, 1927, 28^e année, nouv. sér., n° 1, p. 1-29, 20 figs.
- Parrott, P. J.** A perspective of the oil spray situation. *American Fruit Grower Magazine*, Chicago, Ill., 1927, vol. XLVII, no. 2, pp. 3, 39, 45, 3 figs.
- Passalacqua, T.** Il seccume dei rami di ribes prodotto dalla "Nectria cinnabarina" Fries. *Curiamo le Piante! e La Difesa delle Piante contro le Malattie ed i Parassiti*, Alba, 1927, anno IV e XXII, n. 3, pp. 46-48, fig. 1.
- Petch, C. E.** Some recent results with dusting. *The Canadian Horticulturist*, Peterboro, Ont., 1927, vol. I, no. 2, p. 30.
- Petrak, F.** Beiträge zur Pilzflora von Sternberg in Mähren. II. *Annales Mycologici*, Berlin, 1927, Vol. XXV, No. 3/1, S. 344-388.
- Petri, I.** Rassegna dei casi fitopatologici più notevoli osservati nel 1926. *Bollettino della R. Stazione di Patologia vegetale* [di Roma], Firenze, 1927, anno VII, nuova ser., n. 1, pp. 1-45, figg. 1-2.
[Besides the numerous cases of diseases of wood plants (vine, olive, fruit trees and shrubs, citrus trees, forest, ornamental, industrial plants) and of herbs (cereals, forage, industrial and garden plants) stated in different regions of Italy, the presence of *Kuchneola Gossypii* (Lagerh.) Arth. on *Gossypium* is announced in Italian Somaliland and the first news possessed as yet are given concerning the rolling of the leaves (« Krausekrankheit ») of cotton in that Colony].
- Pinolini, D.** La brina e la vegetazione. *Giornale di Agricoltura della Domenica*, Piacenza, 1927, anno XXXVII, n. 17, p. 152.
- Quantz, B.** Zur Geschichte der Erklärungsversuche der Frassgänge von *Lyonetia clerkella* L., dem Obstlaub-Minierer. *Zeitschrift für wissenschaftliche Insektenbiologie*, Berlin, 1927, Bd. XXII, Nr. 1/2, S. 7-18, Abb. 1-2.

Rabaté, E. Action de l'acide sulfurique sur le piétin du blé. *Journal d'Agriculture pratique*, Paris, 1927, 91^e année, tome I, n^o7, p. 133-135, fig. 19-20.

[*Lepiosphaeria herpotrichoides*, *Ophiobolus graminis*].

Rabaté, E. Emploi de l'acide sulfurique sur diverses cultures. *La Vie Agricole et Rurale*, Paris, 1927, 16^e année, t. XXX, n^o13, p. 206-207.

Rabaté, E. Emploi de l'acide sulfurique sur diverses cultures. *Ministère de l'Agriculture. Direction de l'Agriculture. Bulletin de l'Office de Renseignements Agricoles*, Paris, 1927, année 1927, n^o8, p. 117-118.

Ramakrishna, AYYAR T. V. The rise and progress of Entomology in India. *The Journal of the Madras Agricultural Students' Union*, Coimbatore, 1927, vol. XV, no. 1, pp. 7-18.

Ravaz, I. Notes sur le Mildiou. *Le Progrès Agricole et Viticole*, Montpellier, 1927, 48^e année, n^o18, p. 429-436.

[*Plasmopara viticola*].

Raybaud, LAURENT. Le mildew du houblon (*Pseudo-peronospora humuli*) en Lorraine. *Comptes rendus des séances de la Société de Biologie et de ses filiales*, Paris, 1927, tome XCVI, n^o14, p. 1164-1166.

Reissig, Beobachtungen und Erfahrungen bei der Spannerbekämpfung mittels Flugzeugs im Jahre 1926. *Forstwissenschaftliches Centralblatt*, Berlin, 1927, XLIX. Jahrg., Heft 3, S. 81-89, Abb. 1.

[Fight against *Bupalus piniarius* in Bavaria].

Richmond, E. AVERY. A new phototropic apparatus. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol. 20, no. 2, pp. 376-382, fig. 14-15, pl. 12.

[Instrument for experiments on *Popillia japonica* Newm., concerning the value of colour and light].

Riehm, E. und Schwartz, M. Pflanzenschutz. Anleitung für den praktischen Landwirt zur Erkennung und Bekämpfung der Beschädigungen der Kulturpflanzen. Achte Auflage. Berlin, Deutsche Landwirtschafts-Gesellschaft, 1927, S. II-316, Abb. 1-87, Taf. I-X.

Robinson, R. H. and Hartman, HENRY. A progress report on the removal of spray residue from apples and pears. *Oregon Agricultural College Experiment Station, Station Bulletin* 226, Corvallis, Oregon, 1927, 46pp., 5figs.

Rolet, ANTONIN. Pour défendre les arbres fruitiers contre les chenilles. *La Vie Agricole et Rurale*, Paris, 1927, 16^e année, t. XXX, n^o18, p. 278-286, 7fig.

Rudolfs, WILLEM. Increasing nicotine evolution from tobacco dust. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol. 20, no. 2, pp. 430-431, 3.

Ruggles, A. G. and Wadley, F. M. The green bug in Minnesota. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol. 20, no. 2, pp. 321-327, fig. 12.

[*Toxoptera graminum* Rond.].

NOTES

The First German High Institute for Plant Diseases. — This Institute has been opened near the "Landwirtschaftliche Hochschule" in Bonn-Poppelsdorf. It is managed by Prof. Ernst SCHAFFNIT.

STATISTICS

Crop prospects and estimates.

The figures for the harvest of *wheat, rye, barley* and *oats* in the Northern Hemisphere are now at hand, with the exception of the U. S. S. R., the Kingdom of the Serbs, Croats and Slovenes and a few other producing countries of relatively minor importance.

The results show an aggregate production higher than last year by 6 % for wheat, 15 % for rye, 7 % for barley and 1 % for oats. This year's figures compared with the corresponding figures for the previous six years are the highest recorded for wheat, and for rye and barley were only surpassed by the 1925 figures. Both the 1923 and 1925 production of oats were higher than this year's.

It should be noted that the data for several countries are still only provisional and therefore subject to modifications. However as the weather was adverse to harvesting in some European countries as well as in Canada, where bad weather retarded harvesting in the East and threshing in the West, it is probable that some of the definite figures may be slightly below those at present available.

Production in the Northern Hemisphere. (1)

Year	Wheat	Rye	Barley	Oats
(million metric tons)				
1927	82.0	22.6	25.7	40.5
1926	77.0	19.8	24.1	49.0
1925	78.9	24.8	26.0	52.9
1924	70.8	18.1	21.5	49.0
1923	81.0	22.6	23.9	51.6
1922	74.4	21.1	21.5	45.1
1921	72.3	21.3	22.0	42.1

(1) Excluding the U. S. S. R., the Kingdom of the Serbs, Croats and Slovenes and other producing countries of minor importance.

It seems also that owing to heavy rain in various regions of Europe, during the final growing period and during harvesting, the percentage of wheat unfit for bread making will be higher than usual.

Nevertheless, the average results from cereal production in the Northern Hemisphere may certainly be regarded as fairly satisfactory.

As to production in the Southern Hemisphere, where the crops are at present ripening, the forecast for Australia is not very bright, as lack of rain was detrimental to crops in South Australia and in some districts of New South Wales and Victoria. An unofficial estimate places the Australian crop at about 3.0 million metric tons against 4.4 million metric tons last year. In Argentina, the outlook is rather favourable.

The aggregate production of these two countries in all probability will be below last year's and perhaps slightly below the average for the previous five years. However, the good results obtained in the Northern Hemisphere, more than compensate for the forecasts of a reduced production in the Southern Hemisphere, and the opinion is held that this year's world production will be the highest on record with the exception of the bumper crop of 1923.

In the principal *maize* growing countries of Europe, the crop suffered greatly from drought. In spite of the increased area sown, and the benefits derived in some zones from the September rain, the total crop will be considerably below the very good one of last year.

In the United States, where the weather during the final growing period favoured the crop, estimates have improved, and it is hoped that production will not be very much below last year's although it will fall considerably short of the average for the previous five years.

Production of maize.

(in metric tons).

COUNTRIES	1927	1926	Average 1921-1925
Austria	128,100	97,154	(1) 90,797
Bulgaria	523,600	737,100	533,979
Spain	628,600	436,550	658,742
Hungary	1,700,200	1,944,321	1,482,253
Rumania	3,695,208	6,083,436	3,561,286
Switzerland	3,900	3,300	4,581
Czechoslovakia	269,717	265,502	265,284
<i>Total for Europe . . .</i>	<i>7,009,325</i>	<i>9,667,363</i>	<i>6,602,922</i>
Canada	120,731	198,500	329,564
United States	66,129,903	67,232,713	72,415,818
<i>Total for America . . .</i>	<i>66,250,634</i>	<i>67,431,222</i>	<i>72,745,382</i>
GRAND TOTAL . . .	73,259,959	76,998,585	79,348,304

(1) Average 1922-25.

Japan reports that *rice* production is good and is estimated to be over 10 % above last year's ; less favourable results are shown by the available results for a few other Asiatic countries (Annam and Ceylon). The condition of this crop in the greater part of the rice growing districts of India is fairly promising. On the whole, the rice growing countries of the United States and Europe, report a crop below last year's but above the average for the five years 1921-1925.

Although in Europe, excessive rain injured *potatoes* on heavy soils, and their quality was damaged, it is estimated that as far as concerns quantity the world crop will be above that of last year (which was very poor), and also higher than the average for the previous five years. The data available, comprise a group of countries which grow about half the total production. Among the missing estimates, the most important potato growing countries are France, Germany and the U S S R. Potato production in the U S S R is expected to be poor both as to quantity and quality.

Production of potatoes

(in metric tons)

COUNTRIES	1927	1926	Average 1921-1925
Austria	195,700	1,297,782 (1)	1,633,033
Belgium	3,040,700	3,001,259	2,933,465
Danish	3,000	49,300	32,002
Spain	3,448,900	3,020,778 (2)	2,609,452
Finland	68,000	925,806	701,423
Ireland	720,600	851,008	593,553
Great Britain, England and Wales	3,022,900	2,807,738	3,177,789
Hungary	1,807,200	1,874,623	1,943,550
Italy	782,923	1,012,457	1,070,701
Lithuania	120,000	1,664,518 (2)	1,790,900
Luxembourg	170,500	116,215	163,381
Netherlands	28,592	28,335	110,07
Norway	611,912	891,385	706,490
Poland	2,400,000	2,973,477	2,993,741
Sweden	303,300	248,760	265,060
Switzerland	120,000	1,870,660	1,768,104
Czechoslovakia	22,000	610,000	666,46
	707,217	5,046,680	6,271,05
<i>Total for Europe</i>	<i>60,103,41</i>	<i>50,934,136</i>	<i>55,311,132</i>
United States	2,003,603	2,081,197	1,918,300
	10,743,706	9,022,44	10,700,906
<i>Total for America</i>	<i>12,507,359</i>	<i>11,900,441</i>	<i>13,248,711</i>
WORLD TOTAL	72,611,103	62,834,577	68,560,673

(1) Average 1925 - (2) Average 1921-25

The world production of *sugar-beet* this year will be higher than last year. Particularly noticeable is the increased production in the U S S R of this crop. Information on the quality of the product varies according to country, but in several of the principal growing countries, the sugar content is lower than that of last year therefore it is estimated that the increase in sugar production will be less than the increase in sugar beet.

The information available regarding *wine* production, confirms the opinion held, that in the principal European wine producing centres, results were not very satisfactory as far as quantity, except in Spain. Total production will be slightly higher than the very poor vintage of 1926, but considerably below the average. In the group of producing

countries of Northern Africa, the quantity is higher than last year, but does not fully equal the average for the previous five years.

Production of *olives* is poor in Italy and in Greece, but plentiful in Spain. In the growing countries of North Africa, the forecasts are not very favourable in Tunis and Tripoli, while in Algeria they are fair and in Morocco rather good.

Estimates for the production of *flax* fibre are to hand for the Baltic countries, Poland, Belgium, the Netherlands, Austria and Czechoslovakia. The aggregate production of these countries amounts to 437 million pounds, against 424 million last year and 336 million the average for the previous five years. The news as to production in the U. S. S. R. is fairly favourable. The yield in Ireland is expected to be above the average.

The estimates of *cotton* production in the United States based on crop condition at the beginning of October do not differ very much from last month's estimates. According to this estimate the crop will be about 30 % below the exceptionally good crop of 1926, but about 10 % above the average for the previous five years.

The condition of the cotton crop in India is fairly satisfactory in the principal cotton growing centres, although some damage is reported to have been caused by heavy rain in the Bombay Presidency and there is need of rain in the Central Provinces.

Production of cereals.

(in metric tons)

COUNTRIES	1927	1926	Average 1921-25	1927	1926	Average 1921-25
		<i>Wheat</i>			<i>Rye</i>	
Germany	3,082,940	2,597,185	2,686,700	7,271,565	6,405,905	6,501,288
Austria	281,970	256,864 (1)	241,350	461,490	475,815 (1)	427,191
Belgium	335,944	348,384	359,086	510,002	510,782	522,350
Bulgaria	1,340,300	1,117,600	854,557	214,270	203,400	148,110
Spain	4,052,832	3,989,824	3,876,075	688,167	597,044	704,167
Estonia	—	—	—	167,000	114,055	163,882
Finland	24,450	25,144	20,116	307,050	302,480	287,468
France	7,738,952	6,907,740	7,013,655	934,734	763,069	1,032,430
Great Britain: England and Wales	1,409,257	1,324,925	1,582,594	—	—	—
Greece	361,971	304,019	256,140	30,912	35,875	24,405
Hungary	2,063,900	2,038,682	1,624,202	573,300	798,001	681,759
Italy	5,500,000	6,005,000	5,390,392	163,000	165,000	154,540
Latvia	59,470	50,615	38,895	303,150	155,437	242,200
Lithuania	130,600	113,765 (1)	101,906	534,100	350,800 (1)	594,793
Luxemburg	19,795	16,025	10,068	8,960	8,973	8,877
Norway	15,325	15,991	17,339	16,118	16,438	19,797
Netherlands	138,700	149,324	168,598	345,300	346,563	410,200
Poland	1,485,000	1,281,316	1,199,140	5,984,400	5,011,426	5,121,820
Portugal	307,010	232,372	300,438	112,475	92,412	129,685
Rumania	2,678,725	3,017,761	2,487,724	247,728	235,574	212,630
Sweden	307,200	336,468	288,556	481,100	592,488	556,564
Switzerland	162,800	153,000	132,590	42,100	40,200	41,745
Czechoslovakia	1,030,657	928,889	980,182	1,243,052	1,166,138	1,325,962
<i>Total Europe</i>	<i>32,537,798</i>	<i>30,611,763</i>	<i>30,480,763</i>	<i>20,639,973</i>	<i>18,438,269</i>	<i>19,311,788</i>
Canada	12,485,095	11,153,416	10,179,436	443,552	307,705	530,880
United States (winter	15,044,107	17,082,500	14,984,984	1,562,161	1,016,650	1,727,451
(spring	8,539,591	5,589,513	6,900,834	—	—	—
Mexico	302,306	278,811	283,963	—	—	—
<i>Total America</i>	<i>36,371,099</i>	<i>34,084,240</i>	<i>32,349,167</i>	<i>2,005,713</i>	<i>1,324,355</i>	<i>2,258,331</i>
Korea	272,359	286,220	268,287	—	—	—
Great Lebanon	33,000	23,800	30,820	—	—	—
British India	9,091,589	8,335,545	9,141,375	—	—	—
Japan	765,900	773,754	732,197	—	—	—
<i>Total Asia</i>	<i>10,162,848</i>	<i>9,919,319</i>	<i>10,172,679</i>	<i>—</i>	<i>—</i>	<i>—</i>
Algeria	900,000	640,962	727,096	—	—	—
Egypt	1,206,930	1,012,623	1,002,130	—	—	—
French Morocco	675,000	440,200	589,400	—	—	—
Tunis	150,000	355,000	223,551	—	—	—
<i>Total Africa</i>	<i>2,931,930</i>	<i>2,448,785</i>	<i>2,492,183</i>	<i>—</i>	<i>—</i>	<i>—</i>
GRAND TOTAL	81,993,675	77,064,107	75,494,792	22,645,686	19,762,624	21,570,119

(1) Average 1922 to 1925.

Production of cereals.

(in metric tons)

COUNTRIES	1927	1926	Average 1921-25	1927	1926	Average 1921-25
	<i>Barley</i>			<i>Oats</i>		
Germany	2,672,146	2,462,541 (1)	2,486,715	6,809,198	6,324,555	5,273,129
Austria	224,580	107,555 (2)	162,635	417,200	434,796 (2)	340,311
Belgium	79,175	91,478	89,863	542,774	736,331	594,457
Bulgaria	326,200	260,600	201,745	104,580	107,000	103,058
Spain	2,032,454	2,000,368	2,003,912	556,736	547,046	525,089
Estonia	93,600	131,474	118,955	110,400	133,106	137,900
Finland	180,900	150,100	125,884	538,700	592,726	501,196
France	1,209,902	998,377	955,649	5 407,411	5,285,238	4,362,787
Great Britain: <i>England and Wales</i>	841,287	930,699	994,311	1,312,733	1,513,910	1,398,173
Greece	204,572	177,129	123,829	72,169	80,648	59,105
Hungary	507,700	555,349	483,310	315,200	360,007	328,678
Italy	216,000	240,000	22 1,000	463,900	590,000	545,560
Latvia	142,681	188,555	151,941	222 796	275,916	264,200
Lithuania	185,200	248,664 (2)	214,976	268,100	319,456 (2)	331,766
Luxemburg	3,310	4,011	3,488	40,180	47,162	30,919
Norway	103,361	111,584	95,430	176,635	193,514	165,555
Netherlands	65,900	77,474	72,308	332,000	327,021	302,633
Poland	1,628,800	1,554,506	1,419,020	3,419,000	3,049,769	2,798,926
Portugal	42,729	32,384	41,565	93,070	68,622	93,235
Rumania	1,331,019	1,684,647	1,208,284	842,645	1,159,029	911,820
Sweden	268,900	323,735	281,320	1,123,700	1,249,130	1,094,064
Switzerland	12,700	12,300	11,603	44,400	45,100	40,493
Czechoslovakia	1,197,936	1,143,061	1,091,219	1,317,126	1,370,886	1,190,657
<i>Total Europe</i>	13,620,982	13,679,241	12,566,562	24,031,708	24,820,568	21,393,825
Canada	2,134,723	2,170,322	1,785,511	7,744,913	5,906,102	7,405,118
United States	5,763,114	1,100,538	4,061,932	17,199,850	18,144,026	19,131,078
<i>Total America</i>	7,897,837	6,270,860	5,847,443	25,244,763	24,050,128	26,536,196
Korea	750,794	934,036	707,022	—	—	—
Great Lebanon	16,500	20,100 (2)	21,225	—	—	—
Japan	1,526,192	1,917,629	1,806,939	—	—	—
<i>Total Asia</i>	2,302,486	2,771,765	2,625,186	—	—	—
Algeria	860,000	500,777	670,133	175,000	126,178	194,736
Egypt	260,422	219,833	248,789	—	—	—
French Morocco	800,000	509,279	804,573	30,000	9,082	8,420
Tunis	100,000	192,000	149,000	28,500	31,000	35,400
<i>Total Africa</i>	2,020,422	1,421,889	1,872,495	233,500	166,255	238,606
GRAND TOTAL	25,741,727	24,143,755	22,911,686	49,512,971	49,036,951	48,168,677

(1) Average 1923 to 1925. — (2) Average 1922 to 1925.

International Trade.

SURPLUS QUANTITY OF IMPORTS (T) OR OF EXPORTS (—)

Countries	Wheat		Wheat & flour		Rye		Barley		Oats	
	August 1 June 30		August 1 June 30		August 1 June 30		August 1 June 30		August 1 June 30	
	metric tons	1925-26	metric tons	1925-26	metric tons	1925-26	metric tons	1925-26	metric tons	1925-26
Germany	2,160,755	1,073,917	41,336 +	112,667	381,370	158,794	1,999,593 +	1,079,963	106,214 +	245,394
Austria	(t) 220,361 +	(t) 219,496	(t) 140,991	104,254	(t) 83,782	61,352	(t) 57,953 +	(t) 71,843	(t) 84,271 +	(t) 64,514
Belgium	982,064	979,613	4,454 +	13,101	140,512	203,978	238,780	28,710	18,470	124,930
Denmark	98,413	98,413	98,413	4,911	130,780	203,978	17,309	20,062	19,261	98
Egypt	29,828	(2) 29,828	6,308 +	6,149	47,620	47,620	1,678 +	2,004	—	—
France	1,416,235	1,416,235	91,363	90,822	109,202	141,412	362	755	4,989 +	9,710
Gr. Brit. and North Ireland	4,952,569	4,952,569	1,429	20,914	100,340	18,012	27,045 +	33,103	37,630 +	2,979
Hungary	374,237	291,561	130,449	176,316	231,951	137,868	608,018 +	760,273	226,989 +	419,436
Irish Free State	275,289 +	208,117	153,393	141,621	12,783	12,783	49,660	48,531	33,923 +	55,031
Italy	2,171,944 +	1,691,624	1,532S	29,770	—	—	21,377	16,638	106,206 +	36,405
Latvia	41,124	37,537	611 +	243	9,198	12,003	496	3,290 +	109,088	6,922
Lithuania	186	1,376	—	—	48,134 +	60,014	3,830	3,153	8,635 +	6,669
Norway	98,483	80,237	45,304	64,757	163,735	130,346	24,046	32,519	471	18,444
Netherlands	204,124	139,170	153,570	103,570	163,735	130,346	24,046	32,519	89,006 +	69,770
Norway	204,124	139,170	153,570	103,570	163,735	130,346	24,046	32,519	89,006 +	69,770
Poland	108,185	132,905	79,480	65,873	24,532	282,158	95,498	169,694	82,453	81,425
Kingdom of the Ser. Cr. and Slov.	224,788	247,810	27,180	39,773	37,231	1,248	695,362	298,185	90,408	10,172
Sweden	137,636	152,681	5,936	1,753	12,015	5,815	31,237	22,822	13,086	13,287
Switzerland	405,108	361,690	—	—	25,259	29,046	38,791	11,374	11,356 +	28,536
Czechoslovakia	394,713	159,689	—	—	251	2,023	51,553 +	64,336 +	183,291 +	142,284
U. S. S. R.	(3) 994,730	(3) 467,141	130,324 +	274,244	109,218	166,997	109,430	74,149	48,312 +	64,301
Canada	6,551,690	7,049,235	778,412	877,831	292,846	327,390	822,025	640,001	71,217	408,198
United States	3,471,374	1,173,299	1,120,449	778,709	483,494	221,513	340,222	549,550	122,886	363,320
Argentina	3,420,674	2,232,620	141,054	196,972	138,539	45,999	296,325	185,528	534,152	479,426
Chile	8,260	20,614	412	2,817	—	—	89,553	53,493	77,601	58,680
Ceylon	64 +	69	17,106 +	16,217	—	—	257 +	269	583 +	754
India	90,072	75,897	57,446	56,134	—	—	5,646	7,129	677	700
Indochina	—	—	20,848 +	10,928	—	—	—	—	—	—
Japan	433,715	721,273	48,934 +	73,791	—	—	300 +	904	—	—
Syria and Lebanon	27,036	28,757	16,417 +	32,904	—	—	4,221	8,860	1,753 +	2,221
Algeria	32,529	114,778 +	2,924	1,652	235	1,207	52,376	70,489	20,020	35,052
Egypt	12 +	38,559	153,052 +	200,077	—	—	1,940	6,671	11,094	19,205
Tunis	8,048	109,591	1,856	82	—	—	52,121	43,563	—	—
Union of South Africa	(5) 71,778 +	(5) 101,414	10,980	24,883	(5)	(5)	—	—	785	1,592
Australia	1,951,642	1,429,346	420,976	418,392	—	—	43,395	14,412	1,007 +	3,604
New Zealand	38,587 +	38,468	26,117 +	9,388	—	—	6	1,637	1,515 +	2,648
Total of imports	14,602,435 +	11,707,311	1,428,342	1,408,085	1,382,017	1,138,789	3,336,648 +	2,694,775	959,985 +	1,530,290
Total of exports	17,370,582	13,449,101	2,840,290	2,679,199	1,464,740	1,156,469	3,149,160	2,682,323	1,068,801	1,614,413

SURPLUS QUANTITY OF IMPORTS (+) OR OF EXPORTS (—)

Countries	Maize		Wheat		Rice		Tea		Coffee	
	(November 1-June 30)		(January 1-June 30)		(January 1-June 30)		(July 1-June 30)		(July 1-June 30)	
	metric tons	1925-26	metric tons	1927	metric tons	1927	metric tons	1925-26	metric tons	1925-26
Germany	+	1,180,457	+	271,314	+	158,013	+	71,514	+	115,188
Austria	+	130,927	+	113,473	+	90	+	5,024	+	4,306
Belgium	+	501,007	+	407,077	+	50,279	+	9,323	+	528
Denmark	+	491,731	+	282,197	+	14,044	+	10,362	+	7,525
Estonia	+	112,839	+	239,564	+	3,972	+	2,812	+	216
Finland	+	286	+	206	+	156	+	2,812	+	530
France	+	1,691	+	3,104	+	9,382	+	2,812	+	104
Gr. Brit. and North. Ireland	+	500,540	+	365,014	+	37,401	+	1,319	+	183
Hungary	+	1,186,988	+	1,054,725	+	187,501	+	93,690	+	15,825
Irish Free State	+	44,690	+	135,286	+	1,896	+	55,700	+	18,783
Italy	+	298,740	+	187,550	+	575	+	10,316	+	3,443
Latvia	+	241,824	+	330,730	+	34,571	+	10,440	+	227
Lithuania	+	102	+	150	+	241	+	10,690	+	43,445
Netherlands	+	88,210	+	68,709	+	7,509	+	1,058	+	150
Poland	+	100,082	+	64,720	+	4,143	+	91	+	223
Rumania	+	1,200,540	+	498,241	+	1,027	+	1,904	+	15,952
Kingdom of the Ser., Cr. and Slov.	+	59,830	+	60,210	+	7,501	+	1,604	+	33,530
Sweden	+	76,985	+	91,047	+	17,074	+	12,025	+	6,502
Switzerland	+	243,530	+	255,500	+	58,753	+	1,366	+	2,206
Czechoslovakia	+	107,396	+	28,326	+	3,163	+	9,570	+	4,023
U. S. S. R.	+	—	—	—	—	—	+	351	+	46,048
Canada	+	278,935	+	169,832	+	25,439	+	7,929	+	12,918
United States	+	310,352	+	486,434	+	8,441	+	5,903	+	610
Argentina	+	—	—	—	—	—	+	23,290	+	796
Brazil	+	—	—	—	—	—	+	—	—	—
Chile	+	—	—	—	—	—	+	—	—	—
Ceylon	+	—	—	—	—	—	+	—	—	—
Dutch East Indies	+	47	—	—	—	—	+	—	—	—
Indochina	+	31,084	—	—	—	—	+	—	—	—
Japan	+	48,917	—	—	—	—	+	—	—	—
Syria and Lebanon	+	29,234	—	—	—	—	+	—	—	—
Algeria	+	1,764	—	—	—	—	+	—	—	—
Egypt	+	10,170	—	—	—	—	+	—	—	—
Tunis	+	3,506	—	—	—	—	+	—	—	—
Union of South Africa	+	10,102	—	—	—	—	+	—	—	—
Australia	+	15,929	—	—	—	—	+	—	—	—
New Zealand	+	2,034	—	—	—	—	+	—	—	—
Total of imports	+	6,376,083	+	4,608,090	+	1,117,373	+	1,213,412	+	323,775
Total of exports	—	7,177,943	—	4,500,708	—	1,135,635	—	2,704,278	—	318,783

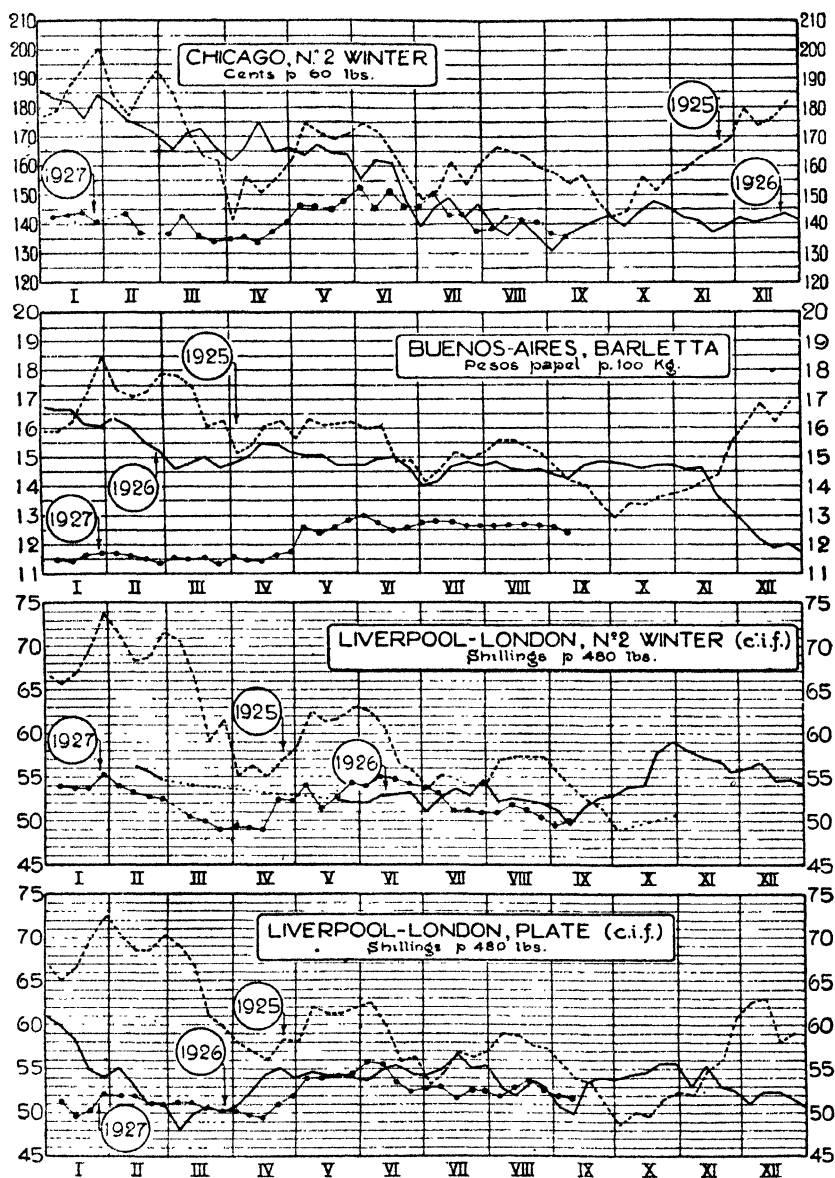
(t) October-May. — (2) Five months. — (3) Eleven months. — (4) Three months. — (5) Nine months. — (6) Four months. — (7) Seven months.

SURPLUS QUANTITY OF IMPORTS (↑) OR OF EXPORTS (—)

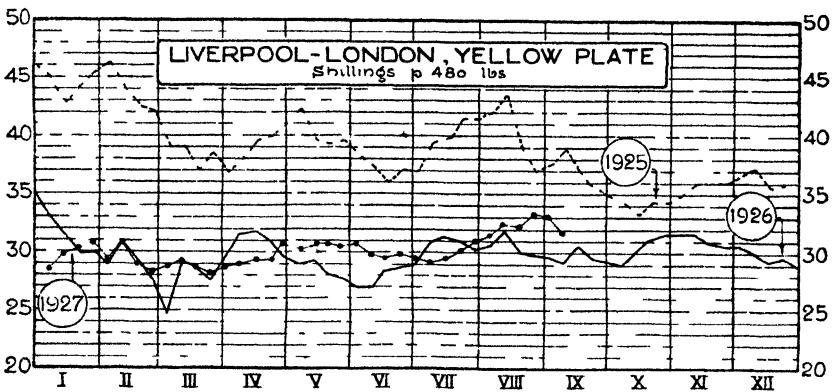
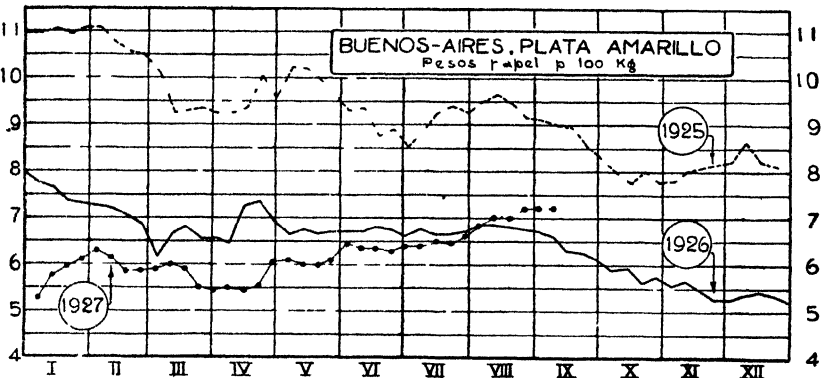
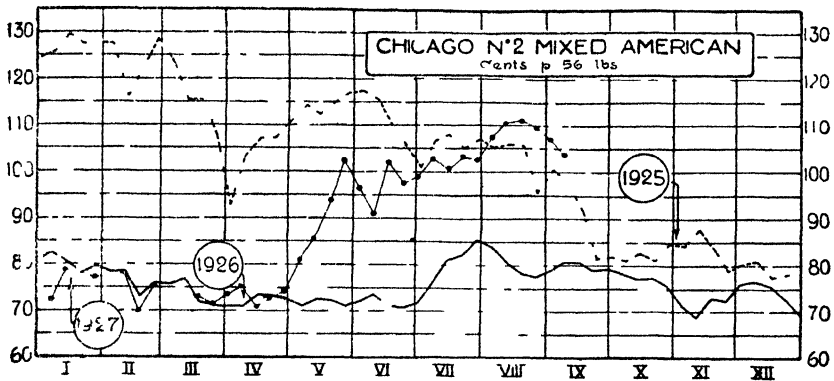
Countries	Butter		Cheese		Cotton		Wool	
	January 1-June 30		January 1-June 30		August 1-June 30		September 1-June 30	
	1927	1926	1927	1926	1926-27	1925-26	1926-27	1925-26
	metric tons		metric tons		metric tons		metric tons	
Germany	47,561 +	44,316 +	32,024 +	24,879 +	426,828 +	287,520 +	162,115 +	104,882
Austria	929 + (1)	701 + (1)	1,243 + (1)	1,459 + (2)	27,452 + (2)	31,034 + (3)	5,828 + (3)	4,715
Belgium (1)	193 +	1,587 +	7,210 +	7,205 +	80,515 +	86,398 +	17,789 +	32,850
Denmark	71,511 +	66,966 +	2,251 +	3,140 +	5,515 +	4,522 +	960 +	687
Spain	—	—	—	—	—	—	—	—
Sweden	—	—	—	—	—	—	—	—
Switzerland	—	—	—	—	—	—	—	—
Finland	3,828 + (4)	3,828 + (4)	668 + (4)	513 + (5)	28,820 + (5)	66,643 + (6)	963 + (6)	3,483
Poland	9,728 +	8,208 +	1,734 +	1,734 +	4,731 +	4,004 +	203 +	201
France	3,753 +	1,984 +	4,380 +	1,194 +	32,802 +	7,856 +	1,176 +	840
Great Britain and Northern Ireland	145,796 +	149,915 +	71,847 +	71,432 +	768,342 +	700,385 +	242,187 +	274,020
Hungary	168 +	115 +	144 +	47 +	5,826 +	3,949 +	18,338 +	18,338 +
Irish Free State	7,073 +	4,282 +	469 +	496 +	—	—	2,419 +	3,447
Italy	768 +	1,444 +	12,150 +	13,727 +	204,889 +	201,002 +	32,700 +	40,126
Lithuania	4,283 +	4,345 +	8 +	1,024 +	1,320 +	1,002 +	420 +	380
Norway	763 +	638 +	247 +	262 +	—	—	161 +	240
Netherlands	23,827 +	20,153 +	44,550 +	36,080 +	2,193 +	1,890 +	226 +	225
Poland	2,600 +	1,957 +	41 +	102 +	37,878 +	31,688 +	2,778 +	3,329
Rumania	66 +	40 +	415 +	491 +	75,273 +	41,555 +	15,432 +	4,962
Kingdom of the Serbs, Croats and Slovenes	54 +	21 +	614 +	353 +	6,531 +	6,054 +	3,846 +	2,511
Sweden	9,832 +	7,403 +	209 +	247 +	22,866 +	20,137 +	6,132 +	5,812
Switzerland	4,027 +	4,220 +	15,341 +	10,346 +	33,147 +	28,876 +	7,928 +	6,731
Czechoslovakia	153 +	153 +	1,361 +	1,431 +	117,613 +	116,462 +	12,324 +	11,332
U. S. S. R.	—	—	—	—	—	—	—	—
Canada	3,198 +	3,433 +	9,024 +	8,413 +	62,599 +	58,675 +	4,046 +	3,480
United States	1,828 +	248 +	17,065 +	11,950 +	2,467,315 +	1,746,386 +	104,418 +	126,528
Argentina	—	—	—	—	—	—	—	—
Chile	—	—	—	—	168 + (8)	12,929 + (8)	14,425 +	135,932
Ceylon	—	—	—	—	—	—	—	—
India	164 +	140 +	40 +	33 +	511 +	1,022 +	—	—
Java	87 +	91 +	230 +	199 +	416,784 +	618,042 +	21,652 +	17,600
Sri Lanka	146 +	186 +	21 +	32 +	646,115 +	607,419 +	34,631 +	23,365
Syria and Lebanon	629 +	382 +	43 +	16 +	110 +	635 +	2,549 +	2,230
Algeria	—	—	—	—	—	—	—	—
Egypt	—	—	—	—	—	—	—	—
Tunis	—	—	—	—	—	—	—	—
Union of South Africa	—	—	—	—	—	—	—	—
Australia	—	—	—	—	—	—	—	—
New Zealand	—	—	—	—	—	—	—	—
Total of imports	209,657 +	209,285 +	138,841 +	122,571 +	2,883,310 +	2,597,087 +	896,987 +	834,424
Total of exports	204,690 —	186,617 —	143,209 —	127,349 —	3,216,945 —	2,681,604 —	723,163 —	709,041

(1) Five months. — (2) July-May. — (3) October-May. — (4) Three months. — (5) Eight months. — (6) Seven months. — (7) Two months. — (8) Six months. — (9) Ten months. — (10) Nine months. — (11) The data on wool, until 31 December 1926, comprise a quantity imported in bond and re-exported after being worked.

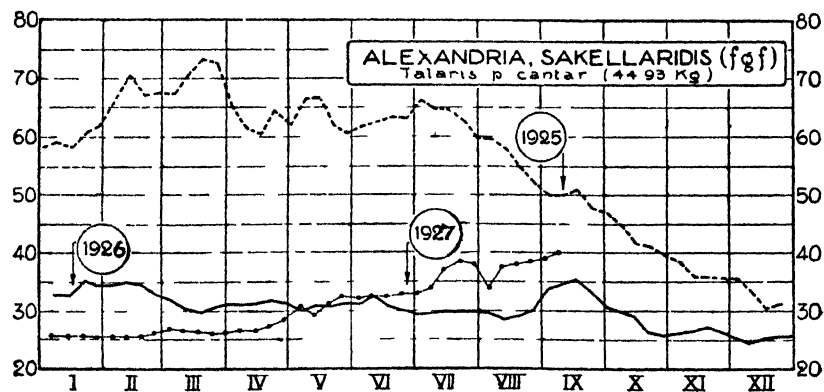
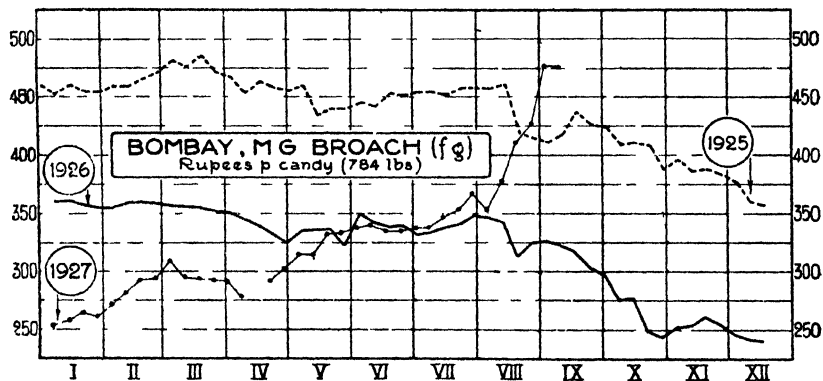
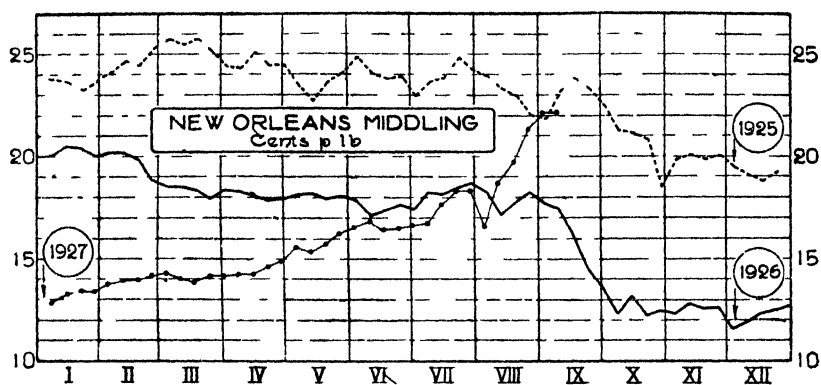
Prices of Wheat.



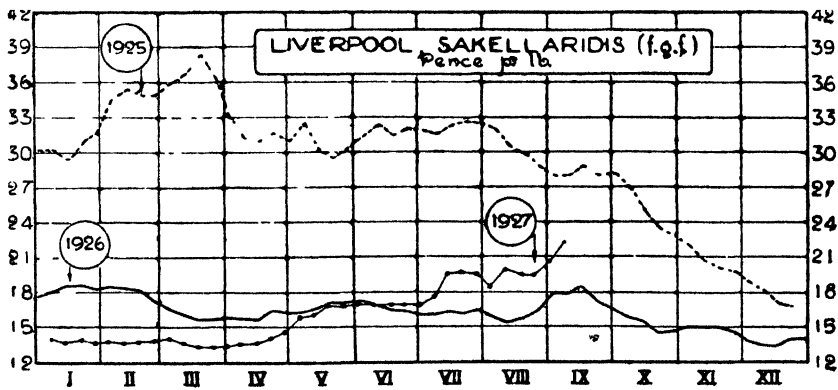
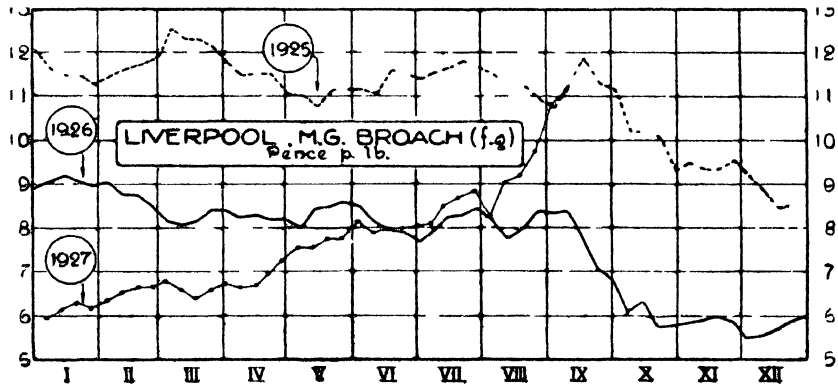
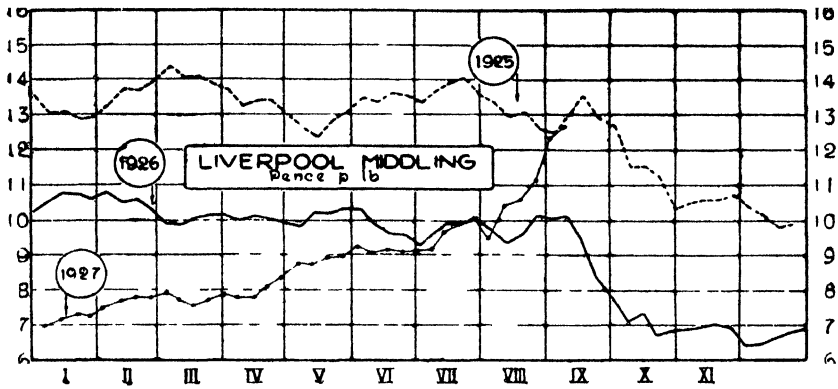
Prices of Maize.



Prices of Cotton.



Prices of Cotton.



AGRICULTURAL LEGISLATION

I - TRADE IN AGRICULTURAL PRODUCTS, FERTILIZERS AND LIVESTOCK.

Argentina. -- A Decree of 16 May 1927 (*Boletín Oficial*, No. 9967 of 7 July 1927), prohibits the importation of fresh guava fruit coming from Paraguay.

Spain. -- A Decree of 2 August 1927 (*Gaceta de Madrid*, No. 216, 4 August 1927) prohibits the exportation of pimiento seeds.

France. -- A Decree of 30 July 1927 (*Journal Officiel*, No. 177, of 31 July 1927) fixes at 550,000 hectolitres the quantity of wine of Tunisian origin and provenance, which may be admitted from 1 August 1927 to 31 July 1928, on the favourable terms specified in the Law of 19 July

*** A Decree of 5 August 1927 (*Journal Officiel*, No. 185, of 10 August 1927) allows temporary free admission of sweet pods for the purpose of pounding and seed extraction. Temporary admission takes place under the general conditions determined by art. 197 to 250 inclusive of the Decree of 28 December 1926, codifying the legislative texts with regard to customs, with the special proviso that for 100 kilograms of sweet pods imported temporarily must be returned for exportation 85 kilograms of shreds and 12 kilograms of seeds. A margin of 2 % is allowed for waste

Italy. -- A Law of 23 June 1927 (*Gazzetta Ufficiale*, 6 August 1927, No. 181) deals with the establishment of a national mark for garden and orchard products intended for abroad. This mark is established by the National Institute for exportation; its use is optional and is confined to exporters (merchants, producers and producers' co-operative societies) inscribed in the official syndical organizations for agriculture and commerce, on condition that these products conform to the qualities of selection, graduation, uniformity, maturity, preservation, etc. prescribed; further the packing must correspond to the forms and dimensions laid down: and the mark must lastly be accompanied by the name and address of the exporter.

*** A Decree of the Head of the Government (*Gazzetta Ufficiale*, 12 August 1927) dated 18 July 1927 founds under the immediate direction of the Prime Minister, a Committee for corporative action as regards prices, costs of production and wages. The Committee shall maintain unity of action in the matter of prices, cost of production and wages with the object of ensuring co-ordination between the action of professional associations and Government associations as regards the policy to be established with respect to the above questions.

*** The Decree-Law of 12 August 1927, No. 1756 (*Gazzetta Ufficiale*,

28 September 1927, No. 224) contains fresh provisions as regards the national mark for garden and orchard products. These provisions give the authorities power to impose compulsory use of the indications determined outside the packages and fix a minimum weight for each parcel, and to prohibit the transport and exportation from the kingdom of goods in the event of non-observance of the provisions established. It establishes further the principle that the authorization of the use of the mark may not be transferred to other persons.

II. -- FINANCIAL AND CUSTOMS LEGISLATION.

France. — A Law of 27 July 1927 (*Journal Officiel*, No. 175 of 29 July 1927) authorizes the Government to make some modifications in the Customs Tariff as an exceptional measure and for a period of three months in order to enable trade agreements to be concluded at once. The same law abolishes the exportation prohibitions and rights already in force as regards living animals (horses, livestock, poultry and pigeons, rabbits) on animal products and residues, on vegetable matters, with exception of corn (wheat, spelt and meslin), rye, trees and narcissus bulbs. Thorough bred animals may be imported free of dues on conditions fixed by the Minister of Agriculture and under the proviso that they are intended for breeding syndicates

*** A Decree of 9 August 1927 (*Journal Officiel*, No. 186, of 11 August 1927) regulates the conditions of customs free admission of thorough bred reproducing animals. All breeding syndicates desirous of importing free of customs thorough bred animals are required to send in duplicate copy to the Ministry of Agriculture, agricultural information bureau, an application conforming to the model annexed to the Decree, indicating the species and number of animals to be imported, the importing office and the approximate date of importation. This application must be accompanied, after inquiry, with the opinion of the Director of the agricultural services of the Department where the syndicate is situated, and also with a certificate attesting the registration of the animal or animals in the stud book or with a certificate issued by a veterinary official of the country of provenance declaring that the animals presented for importation are thoroughbred reproducing animals.

The provisions of this Order do not in any way modify the sanitary regulations in force.

*** A Decree of 27 August 1927 (*Journal Officiel* No. 203, of 1 September 1927) grants, within the limits of the annual contingent to be established every year by Decree of the Minister of Colonies, exemption from customs dues in respect of coffees originating in the French colonies not subject to the metropolitan tariff of African territory under French mandate and the French establishments of the New Hebrides under French direction. In order to benefit by this favour coffees must be imported directly and must be accompanied by a certificate of origin delivered by the local authority.

*** A Decree of 27 August 1927 (*Journal Officiel* No. 203, of 1 September 1927) grants exemption from dues to vanillas originating in Oceania and the French Establishments of New Hebrides within the limit of the annual contingents which shall be fixed by Decree of the Minister of Colonies each year.

In order to obtain this privilege the vanillas must be imported directly

and must be accompanied by a certificate of origin issued by the local authorities.

Italy. — A Decree-Law of 12 August 1927 (*Gazzetta Ufficiale* of 20 August 1927 No. 192) fixes the reductions to be effected in the taxation system, especially for the benefit of agriculture. The reductions are granted in particular in the land tax and the tax on farmers' profits.

Uruguay. — A Decree of 5 July 1927 (*Diario Oficial*, No. 6337, of 15 July 1927) contains the new customs tariff for the importation of plants, fruits and green vegetables (Nos. 5001 to 5068 of the Customs Tariff of Importation into Uruguay).

III. — PLANT PRODUCTION AND INDUSTRY IN PLANT PRODUCTS.

Italy. — A Royal Decree of 12 August 1927, No. 1546 (*Gazzetta Ufficiale*, 1 September 1927, No. 202) approved the Statute and Regulations of the Institute of Domianial Forests.

IV. — ANIMAL PRODUCTION AND INDUSTRY IN ANIMAL PRODUCTS.

France. — A Decree of 3 August 1927 (*Journal Officiel*, No. 184, 8 and 9 August 1927) introduces regulations with regard to the game laws, and creates a refuge park in the territory under the mandate of Togo. A license is required of all persons pursuing game; these licenses are of five kinds: (1) license for capture of game for scientific purposes; (2) big game licenses; (3) trade license; (4) ordinary game license; (5) natives' license. These licenses are valid, as a rule, for one year and are governed by the tariffs established by the Commissioner of the Republic. The latter has also power to determine the degree of protection to be accorded the various animal species; the list of animals the pursuit of which is forbidden in the refuge park; the date of commencement and close of the game season; prohibited arms, etc. A refuge park is instituted for the purpose of forming a reserve and ensuring the re-population of certain species in danger of extinction. The supervision and general regulation of this refuge park shall be fixed by Orders of the Commissioner of the Republic.

Italy. — A Royal Decree of 21 July 1927, No. 1586 (*Gazzetta Ufficiale* of 16 September 1927, No. 215) approves the Regulations for the sanitary inspection of meat. The regulations comprize seven chapters the first of which deals with the organization of public and private abattoirs; the second with the control of slaughtering and inspection of animals and meat; the third, with the control of re-sales and meat warehouses and chilling establishments, the fourth with the transport of meat, the fifth with the control of meat of inferior quality; the sixth with pork butcher's meat; the seventh with the control of poultry, rabbits and game.

V. — AGRARIAN ORGANISATION AND AGRICULTURAL INSTRUCTION.

Chile. — A Law of 25 July 1927 (*Diario Oficial*, No. 19298 of 25 July 1927) establishes a Saltpetre and Iodine Superintendent Board, and a Saltpetre

Committee dependent on the Ministry of Finance. This Board is required to prepare a cadastral survey of nitre beds, draw up a complete roll of properties, lay down rules for nitre bed concessions, study the conditions of transport, consumption and prices of nitrates of sodium, potassium, iodine and other derivatives in national and foreign markets, etc., and lastly adopt all measures necessary for the development and improvement of the nitrate industry in Chile. The Superintendent Board may propose to the President of the Republic the allocation of loans or subsidies with a view to promoting study and experiment having for their object the increase and improvement of production, etc. In order to contribute to the propaganda of saltpetre abroad, the "fomento" bank specially founded by this same Law, devotes every year a sum corresponding to 3 % of the receipts from the chapter of exportation dues on saltpetre and iodine with an annual minimum sum of 6 million pesos. These funds will be handed over to the *Asociación de Productores de salitre de Chile*, which shall submit to the Nitrate Committee for approval its programme of foreign propaganda in favour of Chile saltpetre.

France A Law of 27 July 1927 (*Journal Officiel*, No. 176 of 30 July 1927) in order to facilitate by means of subsidies the foundation of emitting and receiving radio stations for spreading information of value in agriculture or for agricultural propaganda, authorizes the Ministry of Agriculture to raise the necessary credits out of the resources placed at its disposal by the Law of 5 August 1920 up to a maximum of 500,000 francs per annum. The conditions of application of this law shall be fixed in a Decree countersigned by the Minister of Agriculture and the Minister of Commerce and Industry.

VI. -- PLANT PESTS PLANTS AND ANIMALS HARMFUL TO AGRICULTURE.

Argentina - A Decree of 11 May 1927 (*Boletín Oficial*, No. 9967, of 7 July 1927) with a view to avoiding the introduction and propagation of the European corn borer "Pyrausta nubilalis" prohibits the introduction of maize of all kinds either in the form of seeds or plants, in whatsoever state, including maize used for packing agricultural machines etc., as well as Guinea maize either in the form of seeds or dry plants, brought from any part of the world.

Seeds of plants liable to be attacked by the European corn borer can only be imported through Buenos Aires and must be subjected without exception to rigorous disinfection. The Decree contains in an annex the list of plants attacked by the European corn borer.

France A Decree of 1 August 1927 (*Journal Officiel*, No. 183, of 7 August 1927) in order to ensure the protection of the coco tree against plant diseases and parasites in the French Establishments in India and Oceania, has prohibited the importation by sea, the circulation, the deposit in bonding warehouses and the transport of coco-plants, coconuts, coco leaves and all materials capable of containing parasites which attack coco plants. Breach of these rules will be punished in accordance with the provisions of the Decree of 7 May 1915, with respect to the introduction of plants into the French colonies.

Mexico. - A Decree of 5 July 1927 (*Diario Oficial*, No. 14 of 16 July 1927) introduces the Regulations on sanitary police.

In order to ensure the application of the Law on pests of 15 November

1924, of the present Regulations and of the other provisions connected with it, there is founded, under the dependence of the Ministry of Agriculture and "Fomento", the Federal Office for agricultural protection, formed of local delegations and auxiliary bodies.

The *Oficina Federal para la Defensa Agrícola* has the following provisions :-

(a) carry out the studies and researches necessary for determining the agricultural pests and diseases existing in the country or in foreign countries which send agricultural products to the Republic and which may represent a danger to agriculture in Mexico ; (b) study the means of prevention and control best suited for adoption ; (c) execute or ensure the execution of the control and prevention measures adopted ; (d) supervise the execution of the obligations the Law imposes on private individuals and auxiliary bodies ; (e) apply the sanctions authorized by the Law, the Regulations and other provisions connected therewith ; (f) propose to the Ministry of Agriculture and Fomento methods for co-ordinating the Federal Agricultural Sanitary Police Service with those dependent on the local governments and municipal authorities or else give where required its collaboration and assistance according to the terms of art. 9 of the Pests Law , (g) develop among farmers a spirit of defence against agricultural pests and diseases , (h) propose to the Ministry of Agriculture, where necessary, the grant of exemption from customs dues proposed by art. 16 of the Pests Law, etc.

The delegations of the Federal office of Agricultural Protection shall be instituted in those localities where it is necessary to establish, in a permanent manner, the service of agricultural sanitary police.

There is founded as consultative body in phytopathology a "*Consejo Superior de Defensa Agrícola*" composed of the Chief of the Federal Office and the chief of the different services composing it, the Directors of Agriculture and Forests, a secretary of the Ministry and representatives of societies and associations for agricultural defence. This Council meets every week and has the following powers :— (I) draw up the supplementary instructions, specified in the respective articles of the Regulations, in order to specify the measures to be adopted in the regions of the country where control against any pests or disease has been declared compulsory ; (II) draw up periodically a report of the plant products and countries wherein are applied the provisions of art. 19 and 22 of the Regulations ; (III) study and propose to the Ministry of Agriculture all measures connected with agricultural defence ; (IV) establish between the various services responsible for the execution of the Regulations the good understanding necessary for achieving the objects of the Regulations ; (V) direct and supervise the execution of the Regulations ; (VI) give its opinion on questions submitted to it by the Ministry of Agriculture,

The Ministry of Agriculture and Fomento may authorize the formation of national or regional Commissions, as auxiliary bodies in the application of legal provisions with respect to agricultural defence, in the following cases : (I) that a defence zone be established, according to the terms of chapt. II of the Regulations ; (II) that this be applied for by the Chamber of Agriculture of the State in question and, in default, by the corporation representing the agricultural interests of the region, and in default of one or the other, by the

majority of the Co-operative societies or similar associations constituted by the farmers of the locality ; (III) that the party applying submits to the Ministry a list of fifteen farmers, among which the Minister shall choose the five members who are to form the Commission ; (IV) that in cases where the Ministry so demands, the applicant party may furnish the proof that it possesses the financial means for prevention and control measures, independently of the resources the Federal office may place at its disposal.

These national and regional commissions for agricultural defence have the following powers :— (I) collaborate with the Federal Office in the investigation and localization of agricultural pests and diseases and in the study and discussion of means of prevention and control , (II) apply these means by the necessary work and the formation of commissions of agriculturists ; (III) supervise the application of the Law and its regulations ; (IV) draw up the statements relative to breaches of the law and impose the appropriate sanctions ; (V) draw up an estimate of expenditure ; (VI) obtain the voluntary collaboration of municipalities within their area.

Whenever the *Oficina Federal* ascertains the existence of a pest or disease, or even if there is reason to apprehend the appearance of such pest or disease in a determined region, the Ministry of Agriculture and Fomento shall declare the region to be under quarantine and shall establish a control region for the purposes of these Regulations. This declaration shall fix : (a) the precise limits of the region subject to quarantine and the control zone ; (b) if quarantine is absolute or partial ; (c) the plants, agricultural products and other articles which, being considered as vehicles of the pest or disease, are subject to quarantine , (d) in the case of partial quarantine, the places by which plants, agricultural products etc., may leave the country and (e) the processes of inspection and disinfection etc. for the goods due to leave, etc.

The Decree also lays down strict Regulations as regards home trade, importation, exportation of plants and agricultural products, and external quarantines, that is to say, quarantines with respect to plants, their parts or products of foreign origin, attacked by pests or diseases harmful to agriculture.

VII. — AGRICULTURAL CO-OPERATION, INSURANCE AND CREDIT.

France. — A Law of 28 July 1927 (*Journal Officiel*, No. 177 of 31 July 1927) prescribes the creation of an agricultural land bank in Algeria, with a view to completing the organization of co-operative agricultural credit in the colony.

Algeria subscribes 1000 shares of 100 francs to the Land Bank.

The same law authorizes the Governor General of Algeria to borrow from the Bank of Algeria a sum of 30 million francs on the sole condition that the rate is not higher than 2 % and that this sum is repayable, at the latest, by 31 December 1945. This sum must be detailed up to a limit of 18 millions, to the said agricultural land bank, and up to a limit of 21 millions to the social provident works and notably to cheap market dwellings, the popular banks and the consumption co-operative societies in the proportions fixed by the Governor General of Algeria.

*** A Decree of 17 August 1927 (*Journal Officiel*, No. 196, 24 August 1927)

modifies the distribution of funds constituting the agricultural credit endowment between the various forms of credit instituted by the Law of 5 August 1920

The resources of the general endowment of the National Agricultural Credit Bank shall be distributed in the following proportion 11.25 % for short term advances , 23.25 % for medium term advances , 42.50 % for individual long term loans , 23 % for advances to co-operative societies, syndical associations or associations of agricultural collective interest specified in art 22 of the Law of 5 August 1920

AGRICULTURAL ASSOCIATIONS

GENERAL NOTICES.

Austria : THE CENTRAL AGRICULTURAL ORGANISATIONS AND THE CONFERENCE OF PRESIDENTS The protection of agricultural and forestry interests on a legal and vocational basis is in Austria in the hands of the Central Agricultural Corporate Organisations, existing in each Province ; these are as follows :—

Provincial Chamber of Agriculture of Lower Austria, Vienna (*Niederösterreichische Landes-Landwirtschaftskammer in Wien*) ; Provincial Agricultural Council for Upper Austria, Linz (*Landeskulturrat für Oberösterreich in Linz*) , Salzburg Provincial Agricultural Council, Salzburg (*Landeskulturrat für Salzburg, in Salzburg*) , Chamber of Agriculture and Forestry for Styria, Graz (*Kammer für Land-und Forstwirtschaft für Steiermark in Graz*) , Provincial Agricultural Council for Carinthia, Klagenfurt (*Landeskulturrat für Kärnten in Klagenfurt*) , Provincial Agricultural Council for the Tyrol, Innsbruck (*Landeskulturrat für Tirol in Innsbruck*) , Vorarlberg Peasant Farmers' Chamber, Bregenz (*Bauernkammer für Vorarlberg in Bregenz*) , Austrian Agricultural Society, Vienna (*Österreichische Landwirtschafts-Gesellschaft, Wien*) , Burgenland Chamber of Agriculture, Sauerbrunn (*Burgenländische Landwirtschaftskammer Sauerbrunn*)

The constitution of these bodies is not uniform : some are organised on the Chamber system with wide powers extending even to the assessment of the land taxes ; others (e. g., in Carinthia) have very limited powers. Provision is however being made for bringing the latter also under the Chamber system. A technical staff is attached to each of the Central Agricultural Organisations, and there are in each case also subordinate organisations.

In 1922 the President of the Lower Austrian Provincial Chamber of Agriculture succeeded in forming the Conference of Presidents of Chambers of Agriculture, thus bringing the different Chambers together for the purpose of deciding questions of common interest.

The Lower Austrian Provincial Chamber of Agriculture acts as the Secretariat of the Conference of Presidents, and the President of this Chamber is Chairman of the Conference.

In virtue of the Federal Law of 18 July 1924 which deals with the relations between the Federal Authorities and the Agricultural Corporations, the Federal Authorities submit to these organisations all bills and ordinances which have reference to the interests of agriculture and forest management.

By means of the Conference of Presidents, collective approval is given to these laws and ordinances

All questions of importance for the interests of agriculture are, without exception, dealt with by this Conference ; it functions also as a highly important advisory body to the Ministry of Agriculture and Forests.

Italy : NATIONAL ASSOCIATION OF THE RURAL AND AGRICULTURAL BANKS AND SUBSIDIARY BODIES — This association was recognised by the Royal Decree of 30 December 1926. It forms part of the General Fascist Banking Confederation and represents all the rural, and agricultural banks and the subsidiary bodies existing in Italy

In accordance with the terms of constitution of the Association, membership is open to the rural and agricultural banks and to organisations assimilated to them.

The associated bodies are subject to the disciplinary power of the Council of the Association ; in case of refusal of membership or expulsion, the organisation concerned has the right of appeal to the association of superior grade, the final appeal however being to the Ministry of Corporations. In addition to the general purposes defined by the Law of 3 April 1926 on the legal regulation of labour relations, the Association proposes to engage in welfare organisation, technical instruction and the social and national education of the associated bodies.

The organs of the Association are : the Assembly, which frames resolutions on the subjects of chief importance and appoints the Council, which administers the Association and in its turn appoints the Presidential body which consists of a President and a Vice-President

The General Secretary superintends the work of the Bureaux of the Association and makes arrangements for carrying into effect the resolutions of the Council

The annual contribution obligatory on the associated organisations and on those to whom membership has been extended by the Association is fixed every year by the Council within the limits established by the provisions issued by the Ministry of Corporations, in accordance with the terms of the law

CURRENT NOTICES

AGRICULTURAL INSTRUCTION AND EXPERIMENT.

Scientific Research on Tobacco Growing in Australia. — For many years tobacco has been grown in Australia, but for the most part the colour and aroma of the leaves have been unsatisfactory, comparing most unfavourably with Virginian leaf. A leading tobacco manufacturing company, the "British Australasian Tobacco Co., Ltd." has made considerable efforts, but without much success, to discover the reason of the inferiority of the Australian leaves. It has now offered to provide £20,000 towards the cost of a thorough scientific investigation of the whole problem of tobacco growing, on condition that the Commonwealth and State Governments provide £10,000. If, when this sum is exhausted, the results obtained appear to justify it, the Company will give an additional £30,000 if the Governments will give a like sum. Thus altogether £90,000 will be available for the investigation.

The Commonwealth Government has accepted this generous offer, and the executive control of the work is to be handed to a committee of three members, Mr. H. W. GEPP (Chairman of the "Development and Migration Commission"), Dr. A. C. D. RIVETT (Chief Executive Officer of the "Council for Scientific and Industrial Research"), and a third member to be nominated by them, who will probably be Dr. Darnell SMITH of the N. S. W. Department of Agriculture, who is an expert in tobacco growing questions.

The services of other experts in tobacco growing both in the Commonwealth and abroad will be sought, but it is expected, that many years of work will be required before the problems in connection with tobacco growing are solved.

AGRICULTURAL AND SCIENTIFIC ASSOCIATIONS AND INSTITUTIONS.

Research at the Brooklyn Botanic Garden, New York. — In a recently published report a brief survey is offered of the research activities at this institution from its establishment in 1910 up to the present time. The report includes a detailed account of the work done by the Botanic Garden in connection with classification, ecology, plant geography, genetics and phytopathology.

The Brooklyn Botanic Garden Herbarium which at the first was a modest collection (300 specimens in 1912) is now increasing considerably. This collection was augmented in 1912 by the gift of Dr. E. W. OLIVE of his private herbarium of 1000 specimens of flowering plants, and also by the purchase of

2,900 specimens of parasitic fungi. In 1913 the Brooklyn Museum Herbarium was transferred to the Garden and also various collections including approximately 30,000 specimens of vascular plants, 5000 bryophytes, 400 lichens and 1,800 algae. From time to time, the Herbarium has been increased by gift, purchase, exchanges, etc.

The Botanic Garden library comprises at present over 11,000 volumes and more than 8,300 pamphlets. It includes also a number of botanical incunabula. The card catalogue contains more than 55,000 index cards.

With a view to encourage botanic research activity the Brooklyn Botanic Garden has made possible the establishment of two journals, viz., the *American Journal of Botany* and "*Ecology*". In 1922 the Garden became the publisher of the review "*Genetics*". The publication of these serials, together with the *Brooklyn Botanic Garden Contributions* and the *Memoirs of the Brooklyn Botanic Garden*, has made the Garden one of the active centres of botanical publication.

In January 1927 the Garden entered into agreement with the "*American Fern Society*" for cooperation in the management of the *American Fern Journal*, the quarterly publication of that society (Research at the Brooklyn Botanic Garden 1910-1927. *Brooklyn Botanic Garden Record*, Brooklyn, N. Y., July 1927, vol. XVI, No. 3).

CONGRESSES AND CONFERENCES.

Irrigation Congress and Cotton Day. Algiers, first Fortnight of October 1927. - This Congress is being arranged by the "Confédération générale des Agriculteurs d'Algérie". Irrigation problems in connection with agriculture and intensive cultural methods will be investigated. An Exhibition will be held at the same time, illustrating modern improvements in machinery applied to agriculture, particularly in respect of water supply (boring apparatus, distributing pipes, etc., thermal and aerodynamic elevators, etc.).

On Cotton Day the following questions will be examined. The present position of cotton production in North Africa, - The improvement in the varieties of cotton grown, - Cotton-growing on lands not irrigated or lands under irrigation. Technique of cultivation, - Protection of plantations against insects and diseases; - Ginning and cotton trade.

Conference on the Brewing and Alimentation Industries. Ghent, 24-25 September, 1927. These two days will be devoted to the investigation and discussion of questions connected with such industries as dairying, baking, brewing, malting, etc., with cold-storage and with technical instruction. The industrial commercial and scientific aspects will all in turn receive attention. The Honorary President of the Committee will be M. J. WAUTERS, Minister for the Interior, Labour and Social Thrift.

The discussions will be held in seven sections. I. Brewing and malting, II. Distilling, manufacture of yeast, baking, III. The cold-storage industry; IV. Alimentary industries, V. Dairying; VI. Tanning, VII. Industrial education.

For further information: address Secrétariat général des Journées d'études des industries de Fermentation et Alimentation, rue du Lac, 2; Gand, Belgique.

EXHIBITIONS, FAIRS, COMPETITIONS.

Wine Press Machinery Competition. Alcazar de San Juan (Ciudad Real), Spain, 3-9 October 1927. — The tests will be carried out in two sections: — experimental and demonstrative. During the first period, the presses will work under given conditions prescribed by the rules of the competition; in the second, they may work under conditions which the respective makers judge suitable for displaying the advantages of the respective machines.

In the experimental test attention will be paid:—

(a) to the quantity of product pressed in a unit of time; (b) to the average power used during the normal period of working; (c) to the yield of must for each 1000 kg of grapes, for each cylinder; (d) to the analysis of the must of each cylinder in normal regimen (sugar, total acidity, tanning matter, colouring matter); (e) further, the judges may, if they think it desirable, investigate any other features which the respective presses may present as regards handling, etc.

For the demonstration test the mechanical yield, the total yield of must per ton of grapes, the yield of first quality must, and the quality from an organoleptic and chemical point of view, will be taken into account

MISCELLANEOUS.

Wild Edible Plants. — In the French Academy of Agriculture, at its meeting of June 29, 1927, M. COSTANTIN called attention to the important character of the researches of M. BOIS, a professor at the Museum, on plants among all nations and through the ages. M. BOIS indicates the species of plants gathered by natives in their wild state; these plants often possess very poor food values, but with patient effort, by means of long continued selection or through accidental causes, the chief food plants of the world, from very lowly beginnings, have been brought to constantly increasing perfection, and have reached a high position in the scale of food values. There are still many wild plants, in all parts of the world, which might with advantage be carefully studied and cultivated so as to test their possible future as human food.

JOURNALS AND REVIEWS.

The Journal of the Central Bureau of Animal Husbandry and Dairying in India is the title of a new review published by the Government of India to promote the interests of stock breeders in that country. In part I a contributor remarks that although India is very rich in cattle, the price of milk in Calcutta is 75 % higher than in London. Moreover the loss due to the enormous number of beasts not used comes to not less than 60 crores, that is more than 30 million pounds (1 crore = 10,000,000 rupees).

NOTES ON THE INTERNATIONAL INSTITUTE OF AGRICULTURE

The Institute and the IIIrd International Congress of Scientific Management. — The IIIrd International Congress of Scientific Management was organized by a special Committee and the Institute's share in it was limited to the provision of hospitality and collaboration in the work of organization of the Agricultural Section.

The President of the Institute was President of the Agricultural Section and among other distinguished persons who took part in the work of this section were MM. DERLITZKI, SEEDORF, SEMMLER, RAZZA, FAUGERAS, etc. The discussions in this section resulted in the following recommendation,

" Being of opinion that the passage from scientific theory to practical realization requires continuous work for the coordination of research methods, the establishment of definite guiding principles and the institution of a close liaison between the different centres of study, the Agricultural Section requested the International Institute of Agriculture to be so good as to transmit to its International Scientific Council, which will meet in November next and contains a special Commission for Scientific Management in Agricultural Work, the material collected and the resolutions passed by this Congress so far as they relate to Agriculture ".

World Agricultural Census, 1930. — The general interest aroused by the proposal to hold a World Agricultural Census in 1930 is constantly on the increase Mr ESTABROOK, the officer of the Institute who is responsible for the direction of the preparatory work, has recently visited the Hawaiian Islands, Japan, Korea, China and Colon. All these countries, in which agricultural questions are of extreme importance, have taken steps to prepare for and to facilitate the Census in their respective areas.

Forestry. — The two inquiries which have been initiated by the Institute on *Wind Screens and Breaks* and the *Control of Forest Fires* are still bringing in many important replies from a number of the Governments. The material already collected will be examined by the Forestry Commission of the International Scientific Council of the Institute.

Wool Congress at Biella. — On 19 and 20 September the first Congress of the Italian Wool Industry took place at Biella. In the Agenda there were included in addition to questions of special interest to the industry, others relating to sheep breeding and wool production and also to the wool trade and wool statistics. The Institute was represented at this Congress by Sig. DORE,

Chief of the Statistical Service. Among the most important of the reports presented were that of Sig. ROMOLOTTI on the trade in Italian wool, of Sig. D'ALFONSO on wool production in Italy, of Sig. REDA on wool imports and of Sig. MARCHI on sheep rearing in Cyrenaica.

Sig. DORE also presented a report of Wool Statistics in Italy. All these reports gave rise to highly interesting discussions and resulted in important resolutions.

In connection with Sig. DORE's report the Congress unanimously adopted the following resolution :—

“ The first Congress of the Italian Wool Industry ,

“ Recognizing the undoubted advantage that all interested persons would obtain from regular statistics of the production, commerce, stocks and consumption of wool and its derivatives ,

“ Requests the Government to encourage the supply and improvement of the necessary returns, using when ver possible the work of the co-operative associations ;

“ While expressing the opinion that it is necessary that the statistics should be so organized as not to demand from those called upon to assist, excessive labour and loss of time and also so as to guarantee absolutely the secrecy of the information supplied by individuals, expresses the hope that producers, merchants and manufacturers will supply the data required for statistical purposes as speedily as possible and in all frankness in the common interest ;

“ The Congr ss also welcomed warmly the action taken by the International Institute of Agriculture, which has been already strongly supported by the Wool Association on the occasion of the International Congress of Wool Merchants at Turin, 1926, such action having for its object the improvement and unification of the wool statistics in the different countries for the purposes of the international wool statistical service that the Institute hopes to establish

This resolution has been communicated by the Fascist Association of the Italian Wool Industry, which was responsible for the organization of the Biella Congress, to the International Conference which took place at Reichenberg on 6 October and at which delegates from the national associations of merchants and manufacturers of Germany, Belgium, France, Great Britain, Italy and Czechoslovakia were present

Meeting of the International Scientific Council and of the Permanent Commission of Agricultural Associations.— The following are certain details with regard to the organization of this important meeting :—

The *International Scientific Council* consists of 22 distinct commissions and of 5 special sections each attached to the competent commission , the number of the members of the Commissions is 577 and an attempt has been made to secure the representation of practically all the adhering countries

All the experts have been invited to attend the meeting of 7 November and have been provided by the Italian Government with certain travelling and other facilities during their stay in Italy.

At the time of the compilation of this note the number of experts who had signified their intention to attend was 241.

The Agenda for the various Commissions which was sent in due course to all the experts has been unanimously accepted and in response to the request made 80 individual reports have been supplied by members.

As regards the *Permanent Commission of Agricultural Associations* which has a membership of 185 different associations 65 delegates had, when this note was prepared, announced their intention to attend the meeting fixed for 7 November and a large number of reports on the questions figuring on the Agenda of the meeting had been received.

Congress of the International Chamber of Commerce at Stockholm.

— On the occasion of this Congress the Institute was represented by M. Anders FJELSTAD, Delegate of Norway,

The meeting took place at Stockholm from 27 June to 2 July and M. Fjelstad spoke on the work of the Institute and its relations with the International Chamber of Commerce.

International Country Life Congress (East Lansing, Mich., U. S. A., 4-6 August 1927. — M. De Vuyst was the Institute's representative at the International Country Life Congress and was a member of the Committee which drafted the recommendations and resolutions.

The Congress Committee has sent to the Institute a complete set of the recommendations and resolutions adopted, the following being those which are of special interest to the Institute :—

Recommendations.

“(6) The holding of national or district meetings for the study of the problems of country life should be encouraged in the different countries

“It is indispensable that the International Country Life Commission should keep in close contact with other organizations and institutions, whether national or international in character, which are interested in rural family and social life and that it should endeavour to bring about the formation of groups of persons interested in agriculture for the study of these questions where such groups are not already in existence.

“In addition, the International Commission will take care that reports on the human factor in agriculture are brought before rural and urban meetings especially concerned with technical, scientific and economic questions, in order that attention may constantly be directed towards the relation between the human factor and the other aspects of the agricultural problems.

“In this connection it is particularly important that the work should be carried out in cooperation with the League of Nations and the International Labour Office at Geneva, the International Institute of Agriculture in Rome and the International Agricultural Commission at Paris.

“(9) It is important that an International Agricultural Parliamentary Union should be established in order to assist in securing that further progress is made as regards the economic and social problems of agriculture and to raise the level of the conditions of life in the country.

“(10) It is recommended that a copy of the above recommendations and of the resolutions that follow should be sent to the International Institute of

Agriculture, with the request that they should be sent to organizations and institutions which are interested in the question of the betterment of rural life in the various countries, and that the Institute should ask these organizations to supply at least every two years brief reports on the progress made in the sense of the above recommendations and following resolutions:—

Resolutions

" (3) It was resolved that the International Institute of Agriculture at Rome should be requested to undertake the following duties: —

" (a) To make a complete collection of the publications relating to country life for the use of persons desirous of making studies in this field. This collection should include leaflets and pamphlets, reviews and journals, documents, results of enquiries, etc. It is hoped that the Institute will as far as possible allow access to these books and documents to persons specially interested in the question.

" (b) To publish a bibliography of books and a list of documents which have reference to the betterment of the conditions of rural life.

" (c) To enter into relations with important establishment and institutions which issue publications on this question and to draw up a list of these institutions, such list to include the programme and scope of their work.

" (d) To make a collection of photographs, slides and films, diagrams, maps and other forms of illustrative material which may be of service in connection with the improvement of the conditions of life in the country.

" (e) To devote in the International Yearbook of Agricultural Legislation a special chapter containing complete information on all legislation affecting the improvement of the conditions of country life.

" (f) To act as a centre for the collection and distribution of information so as to secure the exchange of illustrative material among the various nations.

" (g) The International Institute of Agriculture should, if possible, appoint a responsible specialist officer for the development of that part of its work which refers to social and rural questions, and also a specialist woman officer to be responsible for all questions relating to household economy, farmers' clubs and home training".

Received by the Library

Ber.=Berlin, Cam=Cambridge, Gen=Genève, Lon=London, Mad.=Madrid, Mil=Milano
 N Y=New York, Par=Paris, Tor.=Torino, Wash.=Washington.

Aminoff, F. Internationell skoglig statistik. Stockholm, Centraltryckeriet, 1927. 82p., 25cm.

"Statistique internationale de sylviculture".

Baden. STATISTISCHES LANDESAMT. Die Landwirtschaft in Baden im Jahr 1925 auf Grund amtlichen Materials. [Karlsruhe i. B.], Badischer Kommunalverlag, 1927. 156S., Karte, Tab., 29,5cm.

Bassermann-Jordan F. VON. Geschichte des Weinbaues. Frankfurt a. M., Frankfurter Verlags-Anstalt A. G., 1923. 3Bde., Abb., Port., Karte, 29,5cm.

Begtrup, H. and others. The folk high schools of Denmark and the development of a farming community. Lon., Humphrey Milford, 1926. 168p., port., 20cm. 6s.

Bodenstein, C. Der Steuerberater des Landwirts. Die wichtigsten Bestimmungen der Reichssteuergesetze sowie des Reichsbewertungsgesetzes für den praktischen Gebrauch des Landwirts. Ber., Parey, 1927. 222S., Tab., 21,8cm. Rm 6.50

Brazil. SERVIÇO DE INSPEÇÃO E FOMENTO AGRÍCOLAS. Regulamento e instruções sobre a realização dos concursos regionais de sementes de cereais e leguminosas alimentares pelas inspeções agrícolas. Rio de Janeiro, Oficinas tipográficas do Serviço de informações do Ministério de agricultura, 1927. 122p., lám., tab., 23cm.

Bresadola, G. Iconographia mycologica. Mediolani, [Arti Grafiche Pizzi & Pizio], 1927. v.2, pl., 24,5cm.

[v. 1 Tab. 51-100 et simul supplementum I. Tab. 99-100 tab. suppl. 11* et 11**].

Cassagne Serres, A. La industria lechera argentina. [Buenos Aires, A. Baiocco], 1927. 88p., cuad., 28cm.

Celli, A. Malaria e colonizzazione nell'Agro Romano dai più antichi tempi ai nostri giorni con prefazione di S. E. Prof. Pietro Fedele. Firenze, Vallecchi, 1927. 198p., ill., 20cm. Lit. 10

Club AZUCARERO DE CUBA. La zafra de Cuba por el Club azucarero de Cuba. Habana, 1927. 20p., cuad., 28cm.

Conegliano. STAZIONE SPERIMENTALE DI VITICOLTURA. Annuario. Volume II. Fascicolo II (1925-1926). Treviso, Longo & Zoppelli, 1927. 266p., 25cm.

Congrès INTERNATIONAL D'AGRICULTURE, XII^{ème}, 1926. Comptes rendus. Varsovie, Comité du Congrès, 1926-27. 3v., 24cm.

The Co-operative UNION, LTD. The 58th Annual co-operative congress 1926. Held in the Assembly Hall, Belfast, 24th, 25th, 26th May, 1926. Edited by A. Whitehead. Manchester, Co-operative Union, Ltd., 1926. 753p., 21cm.

Grandall, C. S. Apple breeding at the University of Illinois. Urbana, (Illinois), University 1926. p. 341-598, ill., tab. (Illinois Agricultural experiment station, Bulletin n° 275).

Fitz Randolph, H. E. The rural industries of England and Wales. Oxford, The Clarendon press, 1926-1927. v.2 and 3, pl., 23,5cm.

10s both.

[v. 2 Osier-growing and basketry and some rural factories. v.3 Decorative crafts and rural potteries].

Frank, E. Ueber Bodenazidität im Walde. Freiburg, H. M. Muth, 1927. 155S., Tab., 23cm.

Fraser, F. H. Foreign trade and world politics: a study of the inter-

national foundations of prosperity with particular reference to American conditions. N. Y., Alfred A. Knopf, 1926. 346p., 21cm. 14s.

Froggatt, W. W. Forest insects and timber borers. Sydney, Alfred James Kent, 1927. 107p., front., ill., 25cm.

Galpin, W. F. The grain supply of England during the napoleonic period. N. Y., Macmillan Co., 1925. 305p., tab., 24cm.

Great Britain. MINISTRY OF AGRICULTURE AND FISHERIES. Report on markets and fairs in England and Wales. Lon., H. M. Sta. off., 1927. v.1, front., pl., 24, 5cm. (Great Britain. Ministry of agriculture and fisheries Economic series, n° 3). [v.1. General review].

Kellner, O. The scientific feeding of animals. Lon., Duckworth, 1926. 328p., tab., 19cm.

Kouban. Сельско-хозяйственный институт. Труды. Краснодар "Кубо-лиграф", 1926. v.4 ill., 26, 5cm.

"Travaux de l'Institut d'économie rurale du territoire de Kouban".

Kurylowicz B. Studja nad za-
leżnością rozwoju roślin od stanu
uogotnienia gleby w różnych okre-
sach wegeracji. Poznań, 1927. 72p.,
ill., 24, 5cm.

• Recherches sur l'influence de l'humidité du sol
sur le développement des plantes pendant diverses
périodes de végétation •

Laporte H. A. Mouvements de
salaires depuis 1914. Par., Recueil
Sirey, 1926. 173p., tab., 25cm.

Lorenz, K. Der Schicksalsweg des
deutschen Siedlungsdorfes in 700 jäh.
Entwicklung. Breslau, Priebsch,
1927. 80S., 19cm. (Heimbücher, herg.
von Wilhelm Schrenmer).

McNamara, H. C. Cotton-spacing
experiments at Greenville, Texas.
Wash., Govt. print. off., 1927. 48p.,
pl., tab., ill., 24cm. (United States.
Department of Agriculture, Depart-
ment Bulletin n°1473).

**Mexique. LÉGATION. OFFICE DE L'AT-
TACHÉ COMMERCIAL.** Le Mexique

d'aujourd'hui. Etampes, Terrier
Frères et Cie., 1927. 40p., tab., 22cm.

Mondaini, G. Manuale di storia e
legislazione coloniale del regno d'Ita-
lia. Roma, Attilio Sampaolesi, 1927.
1v., 25, 5cm. Lit. 50.
[v.1 Storia coloniale].

Moulias, D. L'organisation hydrau-
lique des oasis sahariennes. Alger,
Jules Carbonel, 1927. 305p., pl.
carte, 24, 5cm.

Mozzi, U. I Magistrati veneti alle
acque ed alle bonifiche. Bologna,
Zanichelli, [1927]. 109p., 24cm.

Niccolini, P. Ferrara agricola :
cenni storici e statistici. Ferrara,
Stab. tip. « Taddei », 1926. 202p.,
25, 5cm.

Normandin, A. Du statut juridique
des associations internationales. Par.,
Librairie générale de droit & jurispru-
dence, 1926. 222p., 25, 5cm.

Passelègue, C. Les concasseurs à
noix de palme. Par., Émile Larose,
1927. 162p., ill., pl., 25, 5cm.

**Pologne. MINISTERSTWO SKARBU.
GŁÓWNY DEPARTAMENT.** Polish eco-
nomic conditions in 1926. Warsaw,
Ministry of finance, 1927. 124p., tab.,
diagr., 24, 5cm.

Razous, P. Les moyens préventifs
contre le nombre et la gravité des ac-
cidents dans les exploitations agri-
coles, viticoles et forestières. Par.,
Imprimerie des assureurs, 1926. 38p.,
25cm.

Re, F. Viaggio agronomico per la
montagna reggiana e dei mezzi di
migliorare l'agricoltura delle monta-
gne reggiane: manoscritto edito a
cura di Carlo Casali. Reggio Em.,
Officine grafiche reggiane, 1927. 92p.
27, 5cm. (Società agraria, Reggio Emi-
lia. Atti e memorie. Nuova serie n° 4).

Savini, E. Chimica ed analisi del
latte e dei latticini. Milano, Ulrico

Hoepli, 1927. 542 p., ill., tav., 16cm.
(Manuali Hoepli).

Schifferstein, J. Die russische Lebens- und Genussmittelindustrie und ihre Arbeiterschaft. Zürich, Genossenschaftsdruckerei, 1926. 72S., 20cm.

Schröder, C. Das Studium der Landwirtschaft und verwandter Betriebe auf den Universitäten und Hochschulen Deutschlands. Halle, Buchhandlung des Waisenhauses, 1927. 160S., 23,5cm. Rm. 5,50

Schwabe, A. Courte histoire agraire de la Lettonie. Riga, Section de la presse au Ministère des affaires étrangères, 1926. 63p., 22,5cm.

Schwinger, O. Die landwirtschaftliche Bilanz. Regensburg, Josef Habel, 1926. 244S., 24,5cm.

Stang, V. und D. WIRTH. Tierheilkunde und Tierzucht: eine Encyclopädie der praktischen Nutztierkunde. Ber., Urban & Schwarzenberg, 1927. Bd. 3, Abb., Taf., 26,5cm.

Suisse. DÉPARTEMENT FÉDÉRAL DE L'ÉCONOMIE PUBLIQUE. La Suisse économique et sociale. Einsiedeln, Benziger, 1926-1927. 2v., tab., 25cm.

Talanov, V. V. Сорты яровой пшеницы по данным сети государственного испытания НКЗ РСФСР за 1924 и 1925 г. г. Ленинград. [Всесоюзный институт прикладной ботаники и новых культур при СНК СССР. и Государственный институт опытной агрономии НКЗ. РСФСР., 1926. 231p., pl., carte., tab (en partie hors texte). 26cm.

« The best varieties of the spring wheats ».

Tichelaar, J. J. De Java-Suiker-industrie en hare Beteekenis voor Land en Volk. [Soerabaia, H. van Ingen, 1927?] 212p., tab., 25cm.

« L'industrie du sucre à Java et son importance pour les Pays-Bas et les Indes et pour le peuple indigène ».

Tréné, M. Die wissenschaftlichen Grundlagen der Bodensäurefrage und ihre Nützanwendung in der praktischen Landwirtschaft. Ber., Parey, 1927. 88S., Abb., Karte, Tab., 22,5cm. Rm. 6,50

Turner, L. J. B. Handbook of commercial and general information for Ceylon. Colombo, H. Ross Cottle, 1927 400p., pl., cartes, tab., diagr., 22cm.

Veideman, M. G. К генетике и морфологии ярумяя. Ленинград. [Труды. им. Бухарина] 1927. 70p., ill., tab., 28,5cm.

« A contribution to the genetics and the morphology of barley ».

Verband DER DEUTSCHEN LANDMASCHINEN INDUSTRIE. Die Standorte und Erzeugnisse der deutschen Landmaschinen-Industrie. Ber., Parey, 1927. 200S., Abb., Port., Diagr., Tab. 52cm

Viggiani, G. Il clima del grano in Basilicata. Potenza, Nicola Cappiello, 1927. 57p., 24,5cm.

Wilkins, L. The training and employment of educated women in horticulture and agriculture. [Lon.], The women's farm and garden association. 1927. 52p., 25cm.

Direttore responsabile: Prof. CARLO DRAGONI.

Roma — « L'Universale » Tipografia Poliglotta (C. C. I. di Roma, n° 18891)

Pests, June 1927, *p.* 1137. - Rumania: Experiment Trials on Formol Treatment of Sugar Beet Seed, *p.* 1138.

LEGISLATIVE AND ADMINISTRATIVE MEASURES. - England, *p.* 1140. - Brazil, *p.* 1140. - Belgian Congo, *p.* 1140. French Indochina, *p.* 1141. - Italy, *p.* 1143.

RECENT BIBLIOGRAPHY, *p.* 1144.

NOTES. - Phytopathological Instruction and Phytosanitary Propaganda, *p.* 1148.

STATISTICS.

THE WORLD'S WHEAT SUPPLIES AND REQUIREMENTS FROM 1ST AUGUST 1927 TO 31ST JULY 1928, *p.* 1149

INTERNATIONAL TRADE, *p.* 1153

PRICES OF WHEAT, MAIZE AND COTTON, *p.* 1156

AGRICULTURAL LEGISLATION.

SUMMARY OF NEW LAWS AND REGULATIONS, *p.* 1160.

AGRICULTURAL ASSOCIATIONS.

GENERAL NOTICES: Finland, *p.* 1166. Norway, *p.* 1167.

CURRENT NOTICES.

AGRICULTURAL INSTRUCTION AND EXPERIMENT - An International Organization for the Study of Peat Soils, *p.* 1168. - A Decision of the German Agricultural Teaching Institutes for Coordinating Agricultural Researches, *p.* 1168. The Service of Agricultural Ecology in Portugal, *p.* 1169 - Agricultural Instruction in the Dominican Republic, *p.* 1169.

AGRICULTURAL AND SCIENTIFIC INSTITUTIONS AND ASSOCIATIONS. - Austro-Bavarian Horse Breeding Union, *p.* 1170 - An International Social Scientific Centre at Brussels, *p.* 1170. - The Development of Rural Life in France, *p.* 1170. - Pre-Cooling Station for Fruit at Cape Town, *p.* 1170.

CONGRESSES AND CONFERENCES - Vth International Congress of Genetics; Berlin, 11-17 September 1927, *p.* 1171. - International Congress on Workmen's Gardens; Luxemburg, 20-22 August 1927, *p.* 1172. - International Conference on Flour and Bread Production; Prague, Czechoslovakia, 1-10 September 1927, *p.* 1172 - International Conference on Combustibles; London, 24 September-6 October 1928, *p.* 1172. - 1st International Wool Congress; Biella, Italy, 19 September 1927, *p.* 1172. - IIIrd International Technical Press Congress; Berlin, 26-29 September 1927, *p.* 1172.

EXHIBITIONS, FAIRS AND COMPETITIONS - Biceutenary Coffee Exhibition at San Paolo, Brazil, 7-30 September 1927, *p.* 1173. - General Exhibition of the Products of Ecuador, *p.* 1173. VIIth National Egg Producing Competition; Versailles, *p.* 1173. - Exhibition of Native Timbers,

Guatemala City, 29 May-5 June 1927, *p.* 1174. — Control of Rural Depopulation in France, *p.* 1174. — Italian National Competition for Ensilage, *p.* 1174.

GENERAL NOTICES — The Control of the Fruit and Vegetable Market in British Columbia, *p.* 1174. — Silkworm Breeding in Parama, *p.* 1175.

JOURNALS AND REVIEWS — A Series of Botanical Publications in Uruguay, *p.* 1175. — La Campana, *p.* 1175.

NOTES ON THE INTERNATIONAL INSTITUTE OF AGRICULTURE.

Appointments on the Permanent Committee, *p.* 1176 — Adhesion of Bolivia, *p.* 1176 — Representation of the Institute at Congresses and Meetings, *p.* 1176. — International Congress of Horticulture at Vienna, *p.* 1176. — Meeting of the Bureau of the "Association Internationale Scientifique d'Agriculture tropicale et subtropicale", *p.* 1176 — Protection of Marks of Origin and Description of Cheeses and Unification of Methods of Analysis, *p.* 1177. — International Scientific Council and Permanent International Commission of Agricultural Associations, *p.* 1177. — The World Agricultural Census of 1930, *p.* 1177.

RECEIVED BY THE LIBRARY, *p.* 1178

ECONOMIC AND SOCIAL QUESTIONS

COOPERATION AND ASSOCIATION

The Canadian Wheat Pools.

MCPHAIL, A. J. The Wheat Pool Movement *Cooperative Marketing Journal*, Vol. I, No. 8, Washington, D. C., July 1927. Speech Delivered to the Montreal Canadian Club, 28 March 1927, by A. J. MCPHAIL, President of the Canadian Co-operative Wheat Producers, Limited. — SMITH, D. Selling Canada's Pooled Wheat *Cooperative Marketing Journal*, Vol. I, No. 7, Washington, D. C., June 1927. CROWTHER, Samuel. The Canadian Wheat Pool *Country Gentleman*, Vol. XCII, No. 6, Philadelphia, June 1927. The Pool of the Canadian Co-operative Wheat Producers *International Co-operative Bulletin*, 20th Year, No. 5, London, May 1927. LADLAX, Thomas A. Progress of the Wheat Pools *Nebraska Farmer*, Vol. 69, No. 21, Lincoln, Nebraska, 21 May 1927. — *Grain Grower's Guide*, Vol. XX, No. 14, Winnipeg, 15 July 1927. *National Farm News*, Vol. 2, Nos. 30 and 33, Washington, D. C., 14 May and 4 June 1927. *American Elevator and Grain Trade*, Vol. XLV, Nos. 11 and 12, and Vol. XLVI, No. 2, Chicago, 15 May, 15 June and 15 August 1927. *Modern Miller*, Vol. 54, No. 22, Chicago, 28 May 1927. *Wallaces' Farmer*, Vol. 52, Nos. 19 and 26, Des Moines, Iowa, 13 May and 1 July 1927. — *Oklahoma Cotton Grower*, Vol. VII, No. 15, Oklahoma City, 25 July 1927.

Ten per cent of the world's wheat crop is produced in the three Prairie Provinces of Canada: Manitoba, Saskatchewan and Alberta. The greater part of the Canadian crop is exported to European countries. The wheat is collected at country elevators, from which it is transported by rail to terminal elevators at Fort William and Port Arthur, at the head of Lake Superior. It is then carried by the water-route of the great lakes to Montreal, for direct shipment to Europe, or to Buffalo, whence it is carried to Atlantic sea-board ports of the United States and there shipped to Europe. Some of the wheat produced in Alberta, the most westerly of the three provinces, is carried by rail to Vancouver, on the Pacific

coast, for the Oriental trade. The principal market for Canadian wheat is at Winnipeg, but "spot" wheat is wheat stored in terminal elevators at the head of the lakes or at Vancouver, and the price of grain in the provinces is determined by the "spot" price at Winnipeg, less the expense of transporting the grain to the terminal elevators.

Before the farmers organised themselves for the marketing of their wheat, the producer either sold his wheat to a country elevator at what was called the "street" price, or else he loaded a car and sold it to a "track buyer" or consigned it to a commission agent. There were many complaints that farmers were not fairly treated by the country elevators in the matter of grading or in the reductions made from the price. They also suffered from the discrimination of railway officials when car shortages occurred, or even, as in the case of the exceptionally large crop of 1901, from the inability of the elevators and carriers to handle sufficiently large quantities of grain.

The first efforts of the farmers were to put a stop to abuses. In 1901 the Territorial Grain Growers' Association was formed in Saskatchewan; in 1905, when the territory became a province, the name was changed to Saskatchewan Grain Growers' Association. Similar associations were formed in Manitoba and Alberta and by the efforts of the three associations many of the evils complained of were remedied.

In 1906 the Grain Growers' Grain Company was formed in Manitoba. This was a grain company owned by a group of farmers, and it obtained a seat on the Winnipeg Grain Exchange, though at first the Exchange endeavoured to prevent it from doing so, thereby rendering itself extremely unpopular with the farmers.

Some years later the Manitoba Government was persuaded by the farmers to set up a line of government-owned elevators. Under Government management the elevators were not a success and they were leased to the Grain Growers' Grain Co., which gradually acquired them. In Saskatchewan and Alberta the Governments refused to acquire elevators but advanced provincial funds to companies formed by the farmers, the Saskatchewan Co-operative Elevator Company and the Alberta Farmers' Co-operative Elevator Company. The latter company was afterwards amalgamated with the Grain Growers' Grain Company to form the United Grain Growers, Limited. These companies bought the farmers' grain at their country elevators or accepted it for sale on commission, and, in selling grain, operated on the Winnipeg Grain Exchange.

In 1912, the Canada Grain Act created a board of grain commissioners to supervise the marketing of grain. The commissioners were authorised to erect and operate terminal elevators, and put up elevators at Port Arthur, Saskatoon, Moose Jaw and Calgary, and a port elevator at Vancouver.

As a war measure, the Dominion Government took over the crops of 1917 and 1918 and disposed of them through a board representing the grain trade and the farmers. This board was not continued after the armistice, but in the Spring of 1919 the Canadian Wheat Board was established to market the 1919 crop. The year 1919 was a very pro-

fitable year for the farmers. The Wheat Board made an initial payment of \$ 2.15c. a bushel and a further payment of 48 cents a bushel.

The formation of the Wheat Board was a temporary measure and the Dominion Government refused to renew it, notwithstanding the efforts made for several years by the farmers to persuade them to do so. When at last it became clear that there was no hope of forming a compulsory wheat pool the farmers of the Prairie Provinces started a movement for the formation of voluntary wheat pools.

The movement began in Alberta in 1913, where it was proposed to form a pool and bind the members by a contract to deliver their wheat to it for five years. In Saskatchewan the first proposal was a voluntary pool without a contract. In Manitoba also the formation of wheat pool was being discussed and it was suggested that the three proposed pools should act through a central selling agency. The movement received a great impetus through a visit to Canada of Mr. Aaron Sapiro, the American cooperator who was prominently connected with the formation of large scale co-operative marketing societies in California and other states. Mr. Sapiro addressed many meetings and insisted on the necessity of a five-year contract. On these lines an active campaign for membership began in Alberta and Saskatchewan, in each case with the object of securing contracts covering half the acreage under wheat in the province. In Manitoba it was thought useless to attempt to organise the pool in time to handle the 1923-24 crop.

The first Wheat Pool to commence operations was that of Alberta, which started on 29 October 1923, with contracts covering 2,602,797 acres, or 46 per cent. of the total acreage under wheat. The Saskatchewan and Manitoba Pools were not ready until the following year, but the central selling agency was then immediately formed under the name of the Canadian Cooperative Wheat Producers, Limited.

The provincial pools are organised on a representative basis, and are independent as far as their internal administration is concerned. The provinces are divided into districts and sub-districts, roughly according to acreage. By postcard ballot, the members in each sub-district elect a delegate, who must be a contract-signer and a resident in the sub-district. The delegates of each district then elect one of their number to serve on the board of directors. The directors appoint the manager and elect the officers of the pool.

The board of directors of each provincial pool appoints three of its members to serve on the board of directors of the Canadian Cooperative Wheat Producers, Limited, or Central Selling Agency, as it is frequently called.

The validity of the contract by which the members of the provincial pools bind themselves to deliver all their wheat to the pools has already been tested and upheld in the courts. If a member sells any of his wheat outside the pool, he is liable under the terms of the contract to pay the organisation 25 cents a bushel. The provincial pools, in their turn, are bound by contract to deliver all the wheat collected by them to the Central Selling Agency. They retain control of it from the time of its delivery

to the country point of shipment until it reaches the terminal elevator at Fort William or Vancouver, where it is handed over to the Central Selling Agency.

Prior to the formation of the Wheat Pools the grain dealers sold the wheat as rapidly as they could after the farmers delivered it, and usually about 70 per cent of the crop was delivered before the 1st of January. This resulted in the flooding of the market as not more than half the quantity was really required by the consumer in the period. The movement of grain from country to terminal points during the first three months after harvest has not been reduced, but the movement of wheat to a position in which it can be sold does not affect market values. The Central Selling Agency, however, does not sell wheat until it is actually available for delivery and then only as it is required. Thus from September 1925 to August 1926 it handled some 190,000,000 bushels of the 1925-26 crop, but did not sell more than 20,000,000 bushels in any one month.

A very large proportion of the grain not handled by the Pool is marketed before the 1st of January, so that, by that date, the Pool is practically in control of the entire Canadian wheat surplus, and its policy of securing as high a price as the conditions of the world market will allow is not interfered with by other traders.

The Central Selling Agency is gradually perfecting arrangements for selling the wheat directly and thus avoiding the payment of brokerage commissions as well as the profit of the exporter. Of the first crop handled, about 60 per cent. was sold on the Winnipeg Exchange, but of the 1925-26 crop only about 30 per cent. was sold on the Exchange and of the 1926-27 crop the percentage will have been even smaller.

Handling such large quantities of wheat the Pool is able to secure lower lake freights than other shippers. It moves large quantities when rates are reasonable and avoids loading when rates are high. Grain from Fort William and Port Arthur is moved direct to Montreal and Quebec, or to the lake ports, where it is stored, to be moved according to ocean tonnage bookings to the seaboard ports. The chartering of ocean steamers is done from Winnipeg, and as the Pool is the largest individual charterer of ocean tonnage in the market, it is often in a position to secure more favourable rates. The Pool is represented in practically every importing country and keeps its agents supplied daily with either offers or quotations.

The pools have authority to deduct 1 % of the gross selling price of the wheat to form a commercial reserve. They also deduct 2 cents a bushel from the proceeds of the sale for the purpose of building or acquiring elevators. The elevator reserve is credited to the farmer in proportion to the amount of wheat marketed by him and an interest-bearing certificate will be issued to him at the end of the first contract period. The Central Selling Agency has three terminal elevators at Fort William, with a total capacity of more than 2,000,000 bushels. The Saskatchewan Pool constructed or purchased 90 elevators in 1924-25 and in 1926 purchased, at a price of a little more than \$11,000,000, the elevators of the Saskatchewan Co-operative Elevator Company, thereby increasing the number of its elevators to 587, including two terminal elevators at Port Arthur, a lease of another,

and a transfer elevator at Buffalo. Other elevators are to be built or acquired and the total number under the control of the Saskatchewan Pool in 1927-1928 will be more than 700. In addition new storage capacity of 1,000,000 bushels is to be added to one of the terminal elevators, thereby giving the Saskatchewan Pool a capacity of 16,000,000 bushels at the head of the lakes. The Alberta Pool has 42 elevators under its control and has decided to build or acquire 100 additional country elevators. It has leased a terminal elevator at Prince Rupert and another at Vancouver, with a total capacity of 2,750,000 bushels. It is planning to build an additional terminal elevator at Vancouver, and probably another at Victoria. The Manitoba Pool owns 30 elevators and expects to double this number during the present year. The United Grain Growers, Ltd., though not directly connected with the Wheat Pools, is also increasing the number of its elevators, it is building 21 new elevators this year, besides a large terminal elevator at Port Arthur, with a capacity of 5,500,000 bushels.

The following table contains some statistics regarding the working of the three provincial pools

The Provincial Wheat Pools Membership, Acreage under Contract, Bushels Handled and Gross Turnover

	Members	Acreage under contract	Bushels handled	Gross turnover \$
1923 Crop				
Alberta	25,601	2,116,413	34,218,980	40,646,672
1924 Crop				
Alberta	30,711	2,952,890	23,027,492	35,042,014
Manitoba	9,216	735,866	8,440,214	12,133,379
Saskatchewan	51,268	7,055,590	50,202,599	77,021,243
Total	91,195	10,744,346	81,670,305	124,196,636
1925 Crop				
Alberta	35,997	3,457,673	45,159,505	60,569,910
Manitoba	14,372	1,058,182	12,487,859	23,769,342
Saskatchewan	72,016	9,564,299	129,600,522	181,422,770
Total . .	122,385	14,080,154	187,247,886	265,782,022
1926 Crop				
Alberta	38,460	3,650,703	. .	. . .
Manitoba .	17,234	1,215,047	.	.
Saskatchewan .	80,418	10,664,948	. . .	. . .
Total	136,112	15,530,698	. . .	. . .

During 1925-26 the Central Selling Agency also handled 11,024,000 bushels of oats, 13,221,000 bushels of barley, 1,597,000 bushels of flaxseed and 1,674,000 bushels of rye.

The three pools had about 70 per cent. of the wheat acreage in the Prairie Provinces under contract for the 1926 crop. The highest proportion was in Saskatchewan where, out of a total area sown to wheat of about 13,000,000 acres, 10,664,948 acres were under contract.

The membership of the Pools had already reached 142,000, or 56 per cent. of all the farmers in the three provinces in the first half of 1927 and is still increasing. In June an active campaign was started in all the provinces to obtain the renewal of the contracts and favourable progress is reported by the canvassers.

The overhead selling cost of the Central Agency is very small in relation to the quantity of wheat handled. In 1925-26 it amounted to $\frac{1}{8}$ th of a cent per bushel.

The total proceeds from the sale of the crop are "pooled" and every farmer receives the same price for the same grade of wheat, less the freight from his home point to Fort William, or, in the case of Alberta, to Vancouver. For the 1924-25 crop, the Pools paid their members \$ 1.66 per bushel for wheat graded as No. 1 Northern and for the 1925-26 crop \$1.45 per bushel. Whether the farmers have really obtained higher prices as a result of the operations of the Pools is not easy to demonstrate. The average closing prices on the Winnipeg Grain Exchange for the crop year 1924-25 was \$1.71 $\frac{1}{8}$ for No. 1 Northern wheat and for 1925-26 it was \$1.51. But these prices are mere arithmetic averages, taking no account of the quantity of wheat sold at different prices while the Pool price is actually paid for every bushel of wheat of the particular grade. The Pool price and the Grain Exchange average price are not, therefore, comparable. The officials of the Central Selling Agency claim that the Pools have raised the price of wheat in the interest of the producer and point to the fact that the Winnipeg market now commands a premium over the tariff-protected market of the United States, and that Canadian wheat holds a greater premium than ever over Australian and Argentine wheat.

Apart from the question whether he has obtained better prices, the farmer benefits considerably by the method of payment adopted by the Pool. An initial payment is made when the farmer delivers his wheat to the elevator; a first interim payment in March, when he is in need of money for his seeding operations; a second interim payment in July, for harvesting expenses, and a final payment when the wheat is all sold and the final price has been determined. The initial payment in each year has been \$1.00 per bushel; the interim payment made in March of the present year was 15 cents a bushel. It is claimed that this method of payment is helping the farmer to conduct his business on a cash basis, without having to borrow from the banks.

Hitherto the Canadian Wheat Pools have been an undoubted success, but it remains to be seen whether they will stand the test of a season in which the conditions of the world-market are unfavourable and the price of wheat is unremunerative to the farmer. Much depends, also, upon

whether their members will continue to show sufficient interest to afford a close check on the management of the organisation and to ensure the necessary support. A highly technical question arises, too, in regard to the effect of the operations of the Wheat Pools on the futures market for Canadian wheat. Already the speculators are becoming chary of going into the market, for any one who speculates in Canadian wheat is now at the mercy of the Central Selling Agency, which can quickly raise the price by buying or quickly depress it by selling. If the futures market is destroyed by the elimination of the speculators, it will no longer be possible to "hedge". Now hedging is a form of price insurance. The proprietor of a country elevator who has bought wheat from the farmer protects himself against price fluctuations by selling an equal quantity for the month when he expects to get the wheat which he has bought into the position in which it can be sold for cash (that is, stored in the terminal elevator). If, when he comes to sell for cash, the market has declined five cents, he will lose that sum on every bushel, but it is practically certain that the futures market will have gone down the same amount, so he buys back the grain he had sold and makes five cents a bushel by doing so. In a similar way exporters contract to sell grain abroad before they have actually purchased it, but protect themselves by buying in the futures market an amount equal to their sales abroad. Millers protect themselves in the same way when they make sales of flour for future delivery. The price of the flour, in such cases, is based on the price of wheat at the time the sales are made, but the miller insures himself against fluctuation by purchasing wheat for future delivery as a hedge against the sale of flour. The Central Selling Agency of the Wheat Pools has itself no need to hedge, because it does not buy the members' wheat at a price. It settles at the average price for the whole crop. But the exporters and millers to whom it sells wheat require to hedge and if the futures market is destroyed some other method must be found to enable them to protect themselves against fluctuations in price. As it is, the Central Selling Agency has to take over the futures of exporters. If however, it succeeds in stabilising the price of Canadian wheat, as it hopes to do and is apparently tending to do, there will be less need for the exporters and millers to insure themselves against price fluctuations.

Danish Agricultural Co-operation in 1926.

HERTEL (H.) : *Andelsbevaegelsen i Danmark (Co-operation in Denmark)*. Copenhagen, 1917. — *Statistiske Efterretninger*, No. 11, Copenhagen, 1925, — *Andelsbladet*, Nos. 1, 10, 11, 12, 13, 18, 22, 23, 24, 25, 26, 28, Aarhus, 1927. — AXELSEN DREJER (A.) : *Le mouvement coopératif dans l'agriculture danoise*. — Information communicated to the Thirteenth International Congress of Agriculture, Rome, 1927.

The characteristic feature of the co-operative movement in Denmark is the exceptional development of associations of agricultural producers

and exporters in addition to the fact that the co-operative stores — in no way less remarkable in their progress (1) — are supported not mainly by town people, as in most other countries, but by the rural population. Thus, according to an investigation undertaken in 1919, out of 1,691 distributive societies affiliated to the Co-operative Wholesale Society and with a membership of 317,000, not less than 1,612 (95 %) with about 250,000 members were situated in rural parishes. The definitely rural character of the co-operative stores may also be seen from the fact that in 1910 41 % of their total membership were smallholders (*Husmaend*), 32 % peasants (*Gaardmaend*) and 27 % people of the labouring class.

The development of agricultural co-operation in the proper sense may be seen from the table below, showing what percentage of the farms with more than 0.55 hectares under cultivation are attached to various co-operative associations as well as what percentage of the live stock belong to members of the societies. The figures refer to an investigation undertaken in 1923 in connection with the agricultural census.

	Percentage of farms —	Percentage of live stock —
Co-operative dairies	90	86
Co-operative bacon factories	70	75
Co-operative egg export societies.	22	26
Co-operative feeding stuff societies	31	{ 33 (cows) 35 (pigs)
Co-operative manure supply associa- tions	24	28 (of the area)
Co-operative cattle export societies	11	18

For different reasons, the deflation of the Danish crown, the fall of the prices on the world's market, the English coal strike, etc., the turnover in 1926 of most of the agricultural co-operative associations shows a considerable reduction compared with 1925

For the two co-operative stores associations -- the Co-operative Wholesale Society of Denmark and the Co-operative Society of the District of Ringkjöbing — the total turnover fell from 170 million crowns in 1925 to 138 millions in 1926. As there has been no reduction in the quantity of goods sold to the members, it will be seen that the prices have fallen considerably. The sale of seeds, a business also carried on by the Co-operative Wholesale Society in collaboration with the Danish Agricultural Societies Seed Supplies, accounts for 10 million crowns out of the total turnover.

(1) In 1910 one out of every eleven persons was a member of a co-operative store, whereas the corresponding figure for England was one in fifteen, for Germany one in twenty-nine.

The turnover of the 1362 co-operative dairies — *i. e.*, 82 % of all the dairies of the country — amounted to 575 million crowns or 215 million less than in 1925.

The quantity of butter produced at all the dairies of the country, co-operative and private, amounted in 1926 to 150 million kilogrammes, of which 132 millions or 8 % more than in 1925 were exported. The co-operative dairies account for about 90 % of the production and export.

For the purpose of organising the butter export there existed in 1926, 11 export associations, with, in all, 550 co-operative dairies as members. The importance of the Danish butter export and the share taken therein by the dairy export associations may be seen from the fact that in 1926 $\frac{1}{3}$ of the butter imported into England was produced in Denmark and that 40 % of the total Danish butter export passed through these associations.

Besides the export associations there exists too the Dairy Association of Denmark, a federation of dairies which carry on the manufacture of milk powder and condensed milk.

The co-operative bacon factories, about 50 in number, accounted in 1926 for 3 million or 84 % of the total slaughterings at the slaughterhouses of the country, with a turnover of nearly 415 million crowns (in 1925 520 millions). The total export of bacon from Denmark amounted in the same year to 190 million kilogrammes with a value of 460 million crowns, $\frac{5}{6}$ of which was due to the co-operative bacon factories. Practically the whole Danish bacon export went to England and 50 % of the bacon imported into England was of Danish origin.

Forty-four of the co-operative bacon factories are members of the Danish Bacon Co., Ltd., a joint sales company, with its headquarters in London. The turnover of this company in its first year of working amounted to £300,000 and in 1926 to £6,000,000.

Some of the co-operative bacon factories have also established egg-collecting branches, which undertake to dispose of their members' eggs on the same lines as the Danish Co-operative Egg Export mentioned below.

All the co-operative bacon factories are affiliated to the Union of Danish Co-operative Bacon Factories for promoting national pig-breeding, protecting the interests of the factories as regards transport and sales and representing them in relation to legislative authorities.

The Danish Co-operative Egg Export, a federation of local groups for egg collecting, which started in 1895 with 24 groups and a membership of between 2,000 and 3,000, in had 1926 50,000 members distributed in 700 local groups and a turnover of 15 million crowns (in 1925: 23 millions).

Of the total export of eggs from Denmark, which last year amounted to 42 million scores with a value of nearly 100 million crowns, about one-fourth was effected by the Danish Co-operative Egg Export and the egg collecting branches of the Danish co-operative bacon factories. The principal purchaser is England and Danish eggs made up 25 % of its whole import of this product in 1926.

The Association of the Co-operative Cattle Export Societies included in 1926 about 20 local groups with 15,000 members. The turnover

amounted to 10 million crowns (in 1925 : 19 millions) representing the value of 40,000 animals.

Danish Agricultural Societies Seed Supplies, which, as already mentioned, in collaboration with the Co-operative Wholesale Society furnishes its members with most of the seed which they require, showed in 1926 as also in the previous year a turnover of 6 million crowns, and a membership of 3,000, mostly occupiers of big farms.

Among the co-operative purchase societies the co-operative feeding-stuff societies and the Danish Co-operative Manure Supply are the most important.

At present there exist about 1300 feeding-stuff societies federated into 4 associations with a total membership of 75,000. Each society has to sign a guarantee in proportion to the number of cows owned by the members, who are jointly and severally liable for the payment of goods supplied. As a rule about $\frac{1}{3}$ of the total imports of feeding stuffs into Denmark passes through these associations, which in 1926 had a turnover amounting to 215 million crowns (in 1925 nearly 200 millions).

The Danish Co-operative Fertiliser Supply Association, founded in 1916, included last year 1555 local societies with 76,300 members. The association is organised on similar lines to those of the federations of the local feeding stuff societies except that the guarantee signed by the local societies is estimated according to the area farmed by the members. It showed in 1926 a turnover of 22.7 million crowns (in 1925 : 26 millions) representing an import of 200 000 tons, the largest quantity hitherto sold during any year. The fertilisers imported by the Danish Co-operative Fertiliser Supply amount to about $\frac{2}{5}$ of the total import of the country.

Besides the co-operative societies of agricultural producers and consumers mentioned, there are many other co-operative associations which, though they cannot be characterized as agricultural co-operative societies in the proper sense of the term, are as regards their origin and activity closely connected with these societies, which rank among their most important customers. Among these societies may be mentioned the Danish Co-operative Cement Works, with a turnover in 1926 amounting to 6 million crowns and an output of about $\frac{1}{2}$ million tons ; Danish Co-operative Coal Supply with a turnover of nearly 6 millions and supplying coal to a great number of Co-operative dairies and stores and several co-operative insurance societies, with half a million policy-holders.

C R E D I T

Establishment of Native Reserve (ejidales) Agricultural Banks in Mexico.

Ley de Bancos Agrícolas Ejidales y su Reglamento Secretaría de Agricultura y Fomento : Dirección general de Agricultura y Ganadería : Departamento de Organización y crédito ejidales, 1927 — MCCUTCHEM MCBRIDE, George : The Land Systems of Mexico American Geographical Society, Research series No 12

The fundamental object of the Mexican agrarian revolution, by which was brought about the new constitution of the United States of Mexico, was the restoration to the *pueblos*, or Mexican villages, of the original grants of lands, waters, woods, left in their possession by the Spanish conquerors. Such lands, whether communal or collective property, were called *ejidos*.

All the new institutions now appearing in Mexico and relating to rural economy, land or mortgage claims, are based on this restoration, which, as regards those persons who had usurped the lands, has assumed a revolutionary aspect.

From 1917 onwards Mexican national life has undergone a progressive reconstruction based on the reform of the system of property in land, the programme of which may be thus stated : gradual breaking up of the *latifundia* and making over of the land to the Mexican cultivators.

This work of restoration must necessarily occupy much time, and is therefore still in process of being carried out. As stated in an official report (1) the total area of the original *ejidos* was 15,000,000 hectares. In 1920 land had only been assigned to 243 *pueblos* but the process of ascertainment, assignment and actual partition of the lands has been carried on from year to year.

Whenever the restored *ejidos* appear not to be adequate to the present needs of any district, provision is made in the constitution for making good this deficiency by the expropriation of adjacent lands. The traditional area usually assigned to one *pueblo* was one square league (about 4,387 acres).

It should be explained that in restoring these lands which were the endowment of the native villages it is not intended to revive their collective use and enjoyment in accordance with the Aztec tradition. This

(1) *Boletín Mensual de la Comisión Nacional Agraria*. Mexico. 1917-20.

collective holding is regarded as uneconomic from the standpoint of the Mexican constitution ; and it is instead proposed to build up a system of cultivating ownership of small holdings, linked together by co-operative institutions and also a system of public services of Federal and regional credit, designed to assist and protect the cultivators who have received grants of plots out of the *ejidos*. These individual plots vary in size from 3 to 24 hectares, according to the nature of the land, the water supply and the possibility of irrigation.

It is thus easily intelligible that the important reform of the national land credit, effected by the law of 10 February 1926, and already referred to in this Review (1), had to be speedily followed and consolidated by the formation of special *ejidales* cooperative societies, and by a special service of credit for the benefit of the societies.

The national purpose of this law is supplemented and carried further by the new law of 7 April 1926, which authorises the Ministry of Agriculture and Development (*Agricultura y Fomento*) to establish agricultural banks in the different States of the Republic, where possible, with a view to providing a complete credit scheme, including credit for working capital, for improvements, for the initial work of a holding, the remodelling or restoration of cultivation, or for mortgaging of land. These loans will be made to holders of plots assigned from the *ejidos*, on condition that such persons are organised in special co-operative societies, to which the name *ejidales* is given.

These banks are empowered to make loans up to 300 pesos for the initial work of a holding, and up to 500 pesos if intended for remodelling or agricultural improvements in the interest of individual members. If however the loans are made to the co-operative societies, the amount of the loans must be increased to such a sum that when divided among the members each receives not more than 300 pesos.

Each bank has an initial capital of 200,000 gold (Mexican) pesos, held in shares assigned by name ; these shares are taken up at the time of foundation by the Federal Government which afterwards sells them to the *ejidales* co-operative societies, as these are gradually formed and attached to the Bank which is to serve them.

These local agricultural co-operative societies are on the basis of unlimited joint and several liability. They are obliged to assign not less than 50 per cent. of their profits to the purchase of shares of their own Bank, the State having already subscribed for such shares and paid up the cost. After two years of affiliation to the Bank the societies must also assign for the purpose one-half per cent. of the total of the loans received.

When the co-operative societies have, in this way, acquired more than half of the Bank shares, the Banks will be transformed into local credit societies of the National Bank of Credit, for the purposes of the general law

(1) Issue of June 1927.

on agricultural credit of 10 February 1926, referred to above. Similarly, once the initial capital which has been advanced by the State has been liberated and all the shares have been redeemed by the associated co-operative societies, the Banks will go on to establish, in addition to the group of co-operative societies, unions of local credit societies, for the purposes of the law already indicated.

The legal, economic and practical working bond between Banks and co-operative societies is of a comparatively unusual type, and for that reason and on account of the advantages it possesses, some further details may be given here.

Banks may receive deposits of any kind from co-operative societies and from their members and the Federal Government guarantees interest and deposits during the time needed for transforming the whole system into regional unions in the way already explained.

It lies with the Banks to promote the formation of co-operative societies in their own districts. They are expected in each case to study the economic, agricultural, geographic and social factors which are to be taken into consideration and to ensure that each member of the society has a plot suitable alike for stock-breeding and for carrying on small agricultural industries.

Banks will be required to draw up statistics of the production of their co-operative societies and of the production of their members ; and in addition the statistics of the respective credit operations. They are empowered to organise general warehouses and co-operative resale depots for the benefit of the associated co-operative societies and their members.

They also retain control over the disposal of the commodities produced by the societies and their members ; no society or person holding a loan from the Bank can dispose of such goods without authorisation.

Agreements relating to products are made through the Bank, which may retain a lien on part of the sale proceeds, as a guarantee of loans made, until final repayment

In the event of a society failing to repay, the Bank takes legal proceedings. It makes good its claims, which have priority over every other kind of credit, before a commercial court, in which the books of the Bank will be taken as sufficient proof, and it has power to call upon the unlimited joint and several liability of the debtor members.

It may be mentioned here that the operations of the Banks and of their co-operative societies are exempted from the Federal stamp tax.

The profits of the Bank are distributed among the associated co-operative societies in proportion to the number of their shares, but the co-operative societies are required to assign at least half these profits to the amortisation of the Bank shares.

LAND SYSTEMS

Settlement of Waste Lands in Colombia.

Contrato celebrado entre el Señor Ministro de Industrias y la Compañía General de Negocios S A sobre colonización de una zona de tierras baldías en la región de la Sierra Nevada de Santa Marta, Departamento del Magdalena *Diario Oficial*, year LXIII, No 20526, Bogotá, 24 June 1927

An agreement has been made between the Government of Colombia and the *Compañía General de Negocios* the headquarters of which is at Barranquilla, for the colonisation of a belt of waste lands in the region of the Sierra Nevada de Santa Marta (Department of Magdalena) The whole area is 50,000 hectares, not including those lands which are classed as national forest. The Company has the right of selecting the part on which it will undertake to plant one or more agricultural colonies The number of settlers to be thus established must not be less than 2000, of which 18 per cent must be immigrants brought by the Company at its own expense and risk.

The Company has to carry out certain preliminary work before the arrival of the settlers A complete enquiry has to be made into the agricultural possibilities of the territory to be colonised, and a detailed plan of organisation has to be formulated, both to be ready for submission to the Government of Colombia within a period of 20 months from the time of the signing of the contract. This preliminary work will also include provision for the erection or purchase in Santa Marta of a building suitable as a lodging for settlers on their way through, and also for the construction, on the territory to be colonised, of buildings for housing settlers during the time occupied in their final installation on their respective plots In addition one or more experimental farm plots, of at least 200 hectares each, will have to be planted in advance, on which studies can be made of the agricultural possibilities of the various parts of the Colony. These will make it possible for the settlers to obtain what they need for beginning work, *e. g.*, live stock, seeds, etc At the expiration of the agreement these plots will become national property. Arrangements are also to be made in advance by the Company for establishing a store, where the settlers can buy household utensils, farm implements and other commodities which will be sold to them at cost price, plus 15 per cent. By payment of an interest of 7 per cent, the settlers

can have the articles they require on credit for the first year, paying off the amount of their debt and interest later by means of a payment of 30 per cent. of the value of their crop. Finally the Company is under the obligation of equipping a hospital and dispensaries and of organising an adequate ambulance service.

The Company, in addition, undertakes to build convenient hygienic houses, for ownership by the settlers on payment of the cost price plus 18 per cent., also to construct the roads required for colonisation purposes. If required by the development of the Colony, the Company will also be required to take initial measures for the foundation of one or more urban centres.

The Government, on its side, undertakes to make a grant towards the construction of roads to the amount of 3,500 pesos per kilometre, and to pay to the Company the sum of 50 pesos for each settler.

If the lands which are the subject of the agreement acquire increased value in consequence of the work done by the Company, such increase in value belongs of right to the Company.

For this purpose the Company is authorised to calculate in its own favour the increased value of every lot respectively in the contracts made with each individual settler. Twenty per cent. of the increased value thus obtained by the Company will be assigned to the Government. The Company is required also to pay a guarantee of 3000 pesos.

The agreement will be for 17 years. Clauses are inserted stating the contingencies in which the Government may declare the agreement to be void.

Land Settlement Schemes in the U. S. S. R.

Экономическая Жизнь (*Economic Life*, Nos 7, 43, 49, 50, 168, 187. Moscow, 9 January, 22 February, 1 and 2 March, 27 July and 17 August 1927 — Большаков, М. Колонизационные ресурсы Союза С. С. Р. (BOLSHAKOV, M.: *Colonisation Resources in U. S. S. R.*) *Economic Life*, No 98. Moscow, 4 May 1927. — Борисов, Ив.: Туркестанско-Сибирская магистраль (BORISOV, E.: *The Turkestan-Siberian Railway*). *Economic Review*, Moscow, January 1927. — Колонизационные вопросы в С. С. С. Р. (*Problems of Land Settlement in the U. S. S. R.*) Вестник Маньчжурии (*Manchuria Monitor*), No. 3. Kharbin, 1927

In view of the surplus population of the southern provinces of the U. S. S. R. and in the central agricultural region, and on the other hand in view of the sparseness of population in Siberia and the Far East region, the problem of emigration in these regions assumes for the whole country an importance not only for agriculture but for the national economy as a whole.

The pre-war Russian ministers, P. A. Stolypin and A. V. Krivoschéin, who were acknowledged authorities on the subject, made enquiries into the possibilities of settlement of Siberia and expressed themselves as follows :

"Siberia is rich in every element except the human ; and only when there flows from Russia to Siberia a living stream of labour, will its economic and agricultural prosperity be assured". After the war, as soon as the period of "militant communism" was passed, and even before the new agrarian legislation was codified, there was founded at Moscow in April 1922 the State Institute for the Scientific Study of Internal Colonisation. A comprehensive study of the problem of land settlement having been made, the Department of Emigration is now endeavouring to formulate a policy of scientific emigration, and is using every possible means for its practical execution.

As regards colonisation, the whole territory of the Union, the area of which is 2,093,000,000 hectares, may be divided into two parts, very dissimilar in size.

I. — The first part, amounting to 421,800,000 hectares in all, or 20 per cent. of the whole territory of the Union, includes the western portion of the Union, together with the Caucasus and the Turkmenistan S. S. R. This constitutes the zone of rural emigration. In these areas economic life is very highly developed, and the process of settlement is, speaking generally, completed. It is possible to distinguish for the purposes of this article three main groups as follows:—

1. The first group is an area of 118,900,000 hectares, consisting of the central part of the Black Earth Region, the western provinces, the middle Volga basin and the regions of the North-west, the greater part of the Ukraine and all White Russia. The density of the rural population available for farm work on this area is from 70 to 80, and in some localities 100, inhabitants to the square kilometre, thus equalling and at times exceeding the density of the rural population of Germany, France, Denmark, etc. The limit imposed by the present possibilities of developing the productive forces of the area is already exceeded, and as a consequence it is this area that furnishes the largest number of emigrants.

2. The second group includes the central industrial region, portions of the North-western regions of the lower Volga basin and of the Urals; the region of the Northern Caucasus; the southern part of the Ukraine and all Transcaucasia. Some regions, as for example the central industrial and the North-western, have a density of rural population even greater than those of the first group, but the surplus population here may be absorbed by the earning possibilities of the local large and small industries. In some other regions, for example in the lower basin of the Volga and in the northern Caucasus, there is an abundance of purely agricultural land, and Transcaucasia, although in some parts overpopulated, is a region of intensive cultivation, and at the same time has reserves of unoccupied land, in the shape of areas which could be brought under irrigation.

3. The third group, including the republics of Central Asia, has potentialities for colonisation resembling those of Transcaucasia.

The aggregate area of the second and third groups is 302,900,000 hectares. The numbers of the population and the labour requirements of the area are fairly balanced. Both these groups may be said to be neu

tral in respect of surplus population, since neither emigration nor immigration takes place.

II. — The second and much larger division of the Union, covering areas amounting to 1,671,200,000 hectares, is the zone of immigration. From this aggregate there must be excluded the deserts and sands of Central Asia, *i. e.* an area of 169,000,000 hectares, and the tundras or marshy plains of the North, an area of 298,000,000 hectares, as being incapable of cultivation by the methods actually in use. On the remaining territory, an area of 1,204,200,000 hectares, or 60 per cent. of all the area of the Union, the sparseness of the population is everywhere obvious. This is the proper field for immigration activity. As regards suitability for colonisation the conditions vary greatly.

1. The first part, *viz.*, portions of the regions of the lower Volga basin and of the Urals and the region of the Northern Caucasus, the part of Siberia lying near to the Trans-Siberian railway and the narrow strip in the Far East which lies along the Amur railway, has a total area of 244,000,000 hectares. The total population of the Siberian area lying in this part is about 5,000,000 persons, only 9 per cent. living in towns. The average density is about 10 to 11 inhabitants per square kilometre. The sown area now amounts to 7.2 per cent. of the whole. According to the calculations of the People's Commissariat for Agriculture, there are from 7,000,000 to 8,000,000 hectares of lands not yet under cultivation on which with the present unprogressive agricultural system about 1,200,000 emigrants might be placed. The colonising capacity of this region may be greatly increased if the economic conditions alter. Vast stretches of land, well adapted for farming purposes, remain uncultivated and abandoned because farms cannot dispose of all their produce on the home market, while the distance to any other market makes exporting very difficult; the transport rates are a disproportionately heavy charge on the realised prices of cereals. The new railway which is being constructed for 1440 kilometres between the cities of Frunze (*Pischpek*) and Semipalatinsk will be the shortest rail route between Turkestan and the wheat growing area of western Siberia. It will make possible a reduction of rates for the export of grain to one quarter or one fifth of the present charges, thus placing Siberia in the same economic position as regards external markets as the central regions of European Russia.

The importance of this is seen from the fact that Turkestan is now the centre of the Russian cultivation of cotton. Before the war, in Turkestan, in Transcaucasia, in Khiva and in Bokhara, the area cultivated in cotton was on an average equal to 635,000 hectares with an annual yield of 1,962,000 quintals of fibre. During the years of revolution the production showed a marked decrease and only during the last three or four years has it again approached the pre-war level. In 1926-27 the area under cotton cultivation was larger than it was before the war, the figure reached being 673,000 hectares; but as the average yield per unit of area has dropped, the gross production of cotton is estimated to be in all 1,638,000 quintals, or more than 300,000 quintals less than before the war.

The increase of cotton growing in Turkestan is largely dependent on the cheapness of the wheat imported into the region. When the railway line now under construction is completed, it will be possible to obtain wheat cheaply both from the belt of country through which it passes and from southern Siberia. Indirectly this will be the means of rendering the textile industry of Russia more nearly independent of the importation of foreign cotton. The economic importance of the new railway lies in this fact, and by the same chain of reasoning it is clear that the potential capacity of Siberia as an area for settlement can be increased very considerably.

2. The second division of this area — a wide belt consisting of the districts north of the territory of the Cossacks — covering 72,000,000 hectares and with a population of 2,350,000 persons, has an average density of a little over 3 inhabitants to the square kilometre. It is even more sparsely cultivated than Siberia, although the soil is suitable for farming. In addition there are a number of coal seams. Trade conditions are very backward, but with the construction of more railway lines and the development of industry this region should experience a large increase of population.

3. The regions of Central Asia which are suitable for irrigation and for the development of cotton growing contain lands of which the area may be estimated at 7,600,000 hectares.

4. The last of these immigration zones is the territory situated in the extreme North of the Union, containing 880,600,000 hectares, a belt of immense marshy forests (*taiga*). Apart from Leningrad, the whole population of the North, from Finland to the Urals, amounts to 4,472,000 inhabitants; the average density is 3 to the square kilometre, while the density of population in the neighbouring country of Finland was, in 1925, as much as 9 to the square kilometre. This territory is considered as belonging to the class of "uninhabited lands" since only a very small area is actually under cultivation. The portion lying in European Russia consists of vast stretches of forest and is at present the sole source of the timber supply for the central and southern regions, as also of timber for export. Forestry operations are extremely difficult owing to the shortage of labour and the complete absence of roads. On the other hand the whole of the Asiatic section of this *taiga* zone, from the Urals to the Pacific Ocean, may be said to be almost unexplored up to the present time. So far as is known, it appears to be a country with immense reserves of forest and mineral wealth, and abundance of fur-bearing animals, fish, etc.

. At present, interest is chiefly centred on the southern portion of this zone, where climatic and soil conditions are favourable. The introduction of population is the first consideration, as on an area of 232,000,000 hectares there is an average density of 2 to 3 persons the square kilometre. Without interference with the forest resources and without reducing the forest area, which might affect the climatic conditions of the Black Earth Region, it is practicable here at an early date to devote

to agriculture 25 per cent. of the whole area, or 58,000,000 hectares, thereby sustaining a population of about 8,000,000.

The Far East is also a considerable source of supply of raw materials, but the density of population only amounts to 0.71 to the square verst.

It will be seen from this rapid analysis of the colonisation resources of the U. S. S. R., that in consequence of natural and economic causes there is concentrated on a small fraction, 20 per cent., of the territory of the Union, an immense mass of human labour power, far beyond the existing economic possibilities of profitable employment. On the other larger section, 80 per cent. of the whole territory, the contrary may be observed; there is frequently a complete absence of the labour needed for the exploitation of the great natural wealth. In either case the obstacles to any intensive development of the territory are very great.

In order to give practical shape to the problem of colonisation or land settlement, the Committee of Emigration of the whole Union, in accordance with the instructions issued by the Central Executive Committee of the U. S. S. R., has drawn up the following principles:

1. Emigration should be closely linked with the general scheme of the national economy of the Union and should be directed towards a progressive exploitation of its productive capacity, stimulating agriculture and industry with greater labour supplies.

2. All measures relating to emigration should be based on the principle of the economic return, that is, their object should be to secure with the minimum expenditure the best results in the sense of advancement and stimulation of economic activity in the various regions;

3. In fixing the emigration quotas during the next few years, strict account should be kept of the degree of surplus population in the different regions, and so far as possible emigration from those where land is scarce should be encouraged,

4. All emigration schemes should be preceded by a detailed and complete study of the regions into which it is desired to introduce settlers and should be co-ordinated with the measures proposed in those regions for establishing manufactures and for constructing railways.

During the next ten years land of a total area of 32,230,000 hectares is to be set aside for settlement by 4,714,000 persons. The distribution of this land, and of the population to be transferred, to the various immigration regions is as follows

Regions into which settlers are to be introduced	Lands for settlement — (hectares)	Number of persons who can be settled —
—	—	—
Siberia.	14,000,000	2,000,000
Far East.	8,750,000	1,250,000
Ural Region	3,500,000	500,000
Northern European portion of the R. S. F. S. R.	3,500,000	500,000
Volga Basin region	1,680,000	264,000
Northern Caucasus	800,000	200,000
Total . . .	32,230,000	4,714,000

As emigration regions, where it is the intention to relieve the pressure of surplus population, the following have been recognised in the first instance. the central part of the Black Earth Region, the western provinces of the R. S. F. S. R., the Ukraine and White Russia. The greater part of the migrants are to be taken from these regions in the proportions shown by the following table, where is also indicated the proportion of the quota of each area which is being diverted towards the different new regions where it is proposed to introduce settlers.

Emigration regions	Aggregate total involved in the migratory movement	Distribution of the total migrant contingent population				
		Far East	Siberia	Urals	Volga basin	Northern regions (1)
Central part of the Black Earth Region	939,000	308,000	519,000	49,000	63,000	—
Western provinces	328,000	88,000	172,000	44,000	23,000	1,000
North-west region	118,000	17,000	102,000	29,000	—	20,000
Middle Volga basin	337,000	60,000	138,000	44,000	10,000	85,000
Lower Volga	50,000	—	34,000	—	16,000	—
Central industrial region	136,000	50,000	77,000	3,000	6,000	—
Vyatka-Vetluga region	90,000	21,000	33,000	23,000	—	13,000
Northern region	248,000	—	—	—	—	248,000
Total for the R S F S R	2,326,000	571,000	1,075,000	192,000	118,000	367,000
Ukraine	890,000	359,000	322,000	50,000	59,000	100,000
White Russia	663,000	166,000	368,000	128,000	—	—
Reserve	287,000	46,000	46,000	130,000	37,000	28,000
Total for the U S S R	4,166,000	1,145,000	1,811,000	500,000	214,000	495,000

(1) The scheme for the Northern Caucasus has not yet been formulated

It will be seen that according to the programme of the colonisation institutions the migrant quota will amount in the next ten years to 4,166,000 persons. This movement will not however succeed in absorbing the whole of the surplus labour in the overpopulated regions — especially as the birth-rate in Russia is very high — but it will do much to establish better balanced economic relations between the two factors of agricultural production “the labourer and the land” It will also render possible a fuller exploitation of the natural wealth which still lies almost untouched in the sparsely inhabited regions of the immense territory of Russia

MARKETING OF AGRICULTURAL PRODUCE

The Publication of Index Numbers of Agricultural Products and Costs of Production for England and Wales.

From information supplied by the Ministry of Agriculture to the Bureau of Economic and Social Studies of the International Institute of Agriculture

Base Period and Groups of Commodities, etc — The Ministry's index numbers have as their base the prices realised by commodities in the three years 1911, 1912 and 1913, and the mean of the prices for the three years is used for purposes of comparison. The index numbers calculated on this basis for each commodity are combined to give a general index figure for each of the following groups: (a) agricultural produce, (b) feeding stuffs and (c) fertilisers. An indication is also given in the Ministry's Annual Statistics of the cost of agricultural machinery, seeds and wages of agricultural workers as compared with pre-war prices.

The index figures are made to relate also to three different periods: (a) the calendar year, (b) the harvest or cereal year (September to August) and (c) each month. The base prices for (a) and (b) are the mean annual averages for the calendar years 1911 to 1913 but for (c) they are the mean of the averages for the months of 1911 to 1913 corresponding to the month under review.

Source of Prices Used — With very few exceptions the prices which are used to calculate the index figures are those which have been ascertained by the Ministry from its appointed Market Reporters at certain selected and representative markets throughout England and Wales for publication in its "Agricultural Market Report" issued weekly. The prices are reported at weekly intervals and as a rule are average prices covering the whole of the week. The monthly and annual average are calculated from the weekly averages. The question of corn, milk and hop prices is dealt with specially in a subsequent paragraph.

Structure of the General Index Number. — In computing the general index number for agricultural produce account is taken only of produce sold off farms to the consumer, e. g., stock for fattening being regarded as an unfinished product, and the whole of England and Wales is considered to be one large farm. The commodities and qualities selected for inclusion in the calculation of the general index figure are as far as possible re-

representative of each class and a suitable allowance is made for the relative importance of each class of commodity. The weighting applied to each class is proportionate to the total value of the produce sold and the proportions used hitherto have been those ascertained by the Census of Agricultural Production, 1908. (Modification of the weighting may be necessary as a result of the revised values shown by the Census of Agricultural Production, 1925, and this question is now under consideration).

Index numbers are calculated and published monthly for certain commodities not included in the general index number.

The Monthly Index Figure. — It will be noticed that in the case of the calendar year and harvest year index numbers a fixed base is utilised which is the average of the weekly prices throughout the year but in the case of the monthly index figure a separate base price is used for each of the twelve months of the year. As the monthly price variations in the base years reflect the changes in price of the different commodities due to seasonal variations, it follows that all normal price movements due to seasonal causes are eliminated from a monthly index number with a monthly base. It is hoped, however, to publish at an early date a monthly index number with an annual base side by side with the present monthly index number.

Exclusion of Certain Commodities — A difficulty arises in the case of a few commodities which are not sold at all seasons of the year, such as wool, hops, fruit and vegetables, and it has been the practice to omit all except wool from the calculation of the monthly general index numbers, but they all appear in the calculation of the calendar and harvest year index figures. The difficulty as regards wool has been obviated to some extent by utilising prices realised throughout the year at the Bradford wool exchange, but the prices realised at country wool sales are used to calculate annual index figures.

Cereal Year Index Figure — As regards the harvest or cereal year index the object of adopting the period September to August is to obviate the erroneous comparisons which may be drawn from the use of prices relating to crops harvested in different years. For example wheat harvested in August 1927 is sold in the year September 1927 to August 1928, whereas prices ascertained during the calendar year 1927 relate to eight months sales of the 1926 crop and four months sales of the 1927 crop. No corresponding advantage is gained in the case of commodities, such as fat cattle, milk, and eggs which are produced all the year round.

Corn, Milk and Hop Prices. — As indicated in an earlier paragraph of this memorandum the prices utilised in the calculation of the index numbers are usually those ascertained weekly from certain selected and representative markets for publication in the Ministry's "Agricultural Market Report". In the case of corn, *i. e.*, for wheat, barley and oats, the returns secured under the Corn Returns Act, 1882, serve as a means of obtaining the necessary prices. This Act requires every buyer of British corn at the markets scheduled in the Act (of which there are 173 at present) to furnish a return of his transactions during each week of the year and this return states the quantity and prices of the corn purchased.

The milk prices used are those ascertained monthly from Reporters'

estimates of the average contract prices ruling in the four large producing areas serving (1) London (East), (2) London (West), (3) Birmingham and (4) Manchester.

For hops the estimates of average prices from sales taking place on the London and Worcester Hop Exchanges are utilised.

Agricultural Machinery. — The index number for agricultural machinery is ascertained on the basis of prices paid for the implements, machinery, etc., necessary for the cultivation of a 500 acre farm, *i. e.*, 400 acres arable and 100 acres grass, the base prices being those paid in the year 1914.

Seeds. — The average prices of seeds for the years 1910 to 1914 as ascertained by the Royal Commission on Agriculture (Minutes of Evidence — Sept. 1919) form the base and current wholesale prices at London are utilised at present.

Wages of Agricultural Labourers. — The index numbers are based upon an estimated average wage in 1914 of 18s per week (including the value of allowances in kind). The rate of wages now used for calculating the index number is the monthly average of the minimum rates operative in the various districts under the Agricultural Wages (Regulation) Act, 1924. No account is taken of the variations which have taken place since 1914 in the number of working hours or of the additional earnings of horsemen, stockmen, shepherds, or other skilled workers whose duties in connection with the care of animals entail longer working hours than those of the ordinary labourer.

Currant Trade in Greece.

ILIADES, G. L'Office Autonome du raisin sec et son activité *Le Messager d'Athènes*, Nos 1325, 1326, 1332 and 1335 Athens, 16, 19, 23, 26 May 1927

The importance of the currant trade in Greece is shown by the fact that out of the world export of currants which amounted to 2,376,000 quintals in 1925, the export from Greece alone was not less than 947,103 quintals (1). Taking the total value of commodity exports from Greece as about 5,541,000,000 drachmas in 1925, the value of the currant export was the highest after that of tobacco and was represented by 782,834,279 drachmas (2).

The organisation of the trade in currants has undergone a number of changes in the course of the last thirty years. The policy in Greece in respect to this trade has always been to retain in the country the surplus of production over the foreign consumption of currants and to utilise this surplus for manufacture of wines, and of alcohol which may be employed in perfumery, etc.

(1) International Year-book of Agricultural Statistics. Rome, International Institute of Agriculture, 1927, pp. 289-419.

(2) *Bulletin mensuel du Commerce spécial de la Grèce*, Athènes, 1926, pp 51-52

Later on an endeavour was made to assign to the State the direct control of this surplus. Thus a duty was imposed on exported currants, and subsequently an additional tax in kind was levied, which had the effect of withholding a certain stock intended to maintain the balance between the supply of the product and the consumers' demand. This system was inaugurated in 1896 but was abandoned in 1899 on the introduction of new methods of organisation and working. The "Banque du raisin de Corinthe" was formed, the managing body being elected by the representatives of growers of the vine-growing regions, meeting every three years at Patras under the chairmanship of the prefect. This bank was however not fated to succeed. Five years after its foundation, its liabilities amounted to some ten million drachmas against assets consisting of doubtful credit from loans which had been made to growers and a large stock withheld of 200,000,000 Venetian pounds of currants.

In 1905 the "Société Priviligée pour le Commerce et la Production du raisin de Corinthe" was formed. This institution was expected to purchase currants in any quantity that might be offered at the rate of 115 drachmas per thousand Venetian pounds or even consignment notes at the same price, and to pay the land tax on currants, amounting to 4,000,000 drachmas yearly. In exchange for these services the Company was allowed to withhold stock up to 35 per cent. of the currants exported, as well as an insurance premium of 7 drachmas per thousand pounds of currants gathered. Every time, however, that production and export balanced, the Company's obligations disappeared. During the war, when the export trade dwindled, the Company obtained temporary exemption from the obligations resulting from the convention but it continued to exercise the rights granted in return. After the war, when conditions had completely changed, and an extraordinary rise had taken place in the prices of currants, no care was taken to revise the obligations of the Company on the basis of the new monetary situation.

The table on page 283 shows the production of currants, as well as the export figures and prices in wartime and in the after-war years.

The disproportion between production and export of currants shown in this table is significant of the crisis which came about in consequence of over-production or excess in supply, and also as the result of the economic straits of the growers who find themselves obliged to sell, their position being due to absence of collective organisation. The Company was not in fact the right type of institution for the impartial serving of the opposed interests of production, marketing and consumption.

It was for this reason that the representatives of the currant growers associations requested that the direction of the trade in currants might be taken out of the Company's hands, the State to repurchase the privilege in virtue of the right conferred by the convention, and the management to be entrusted to the National Bank, the most powerful institution in Greece. Following on the convention of 13 August 1924 with the State, this Bank assumed control of the stock held in reserve, requested the General Warehousing Society to undertake the storage and opened a special account "Currants", into which was passed the sum realised by the winding up of

Years	Production	Exports	Prices per 1 000 pounds in gold drachmas
	thousands of Venetian pounds		
1914.	300	248	179
1915.	255	209	250
1916.	185	107	350
1917.	240	52	350
1918.	240	200	350
1919.	258	220	620
1920.	275	178	} Period of extensive fluctuations of the drachma
1921.	245	197	
1922.	243	162	
1923.	220	190	
1924.	340	180	
1925.	325	179	

the Privileged Company for Currant Growing and Marketing, amounting to 5,000,000 drachmas, or more than 170,000 pounds sterling.

A Council of Management, consisting of representatives of the Ministries of Agriculture, National Economy and Finance, representatives of the National Bank, general warehouses, and associations of currant growers, was appointed to supervise the application of the convention, and in the interests of the Revenue Department to approve credits for the extension of the trade in currants, etc.

The first year of management of this withheld stock by the National Bank, the production reached the figure of 325,000,000 Venetian pounds, and it proved possible to export, as has already been stated, 947,103 quintals the distribution by importing country being as follows (1) :

Great Britain	450,903	quintals
Germany	96,303	»
Italy	95,450	»
Netherlands	94,958	»
United States	74,896	»
Egypt	12,294	»
France	8,749	»
Canada	8,377	»
Belgium	4,720	»
Yugo-Slavia	886	»
Other countries	9,567	»

(1) *Ibid.*, pp. 91-92.

In collaboration with the General Warehouses the National Bank has established 40 currant receiving centres, replacing the 22 used by the Privileged Company. More than 300 new depots have been instituted as well as those handed over by the Company.

Parallel with the administration by the National Bank of the stocks withheld, the Independent Currant Office was created by virtue of the law of 10 August 1925. This is a State institution, which regulates the general currant position, and on the basis of information collected as regards production and the international market also regulates the quantities to be exported as well as the stocks withheld and intended for industry.

The Office is administered by a council consisting of three members appointed respectively by the Ministries of Agriculture, National Economy and Finance ; one member is appointed by the General Warehousing Company, two representatives of the Currant Export Trade are elected by the Patras and Calamata Chambers of Commerce, one by the owners of vineyards ; five others represent currant growers and are elected by an electors' meeting representing the Growers' Associations. The objects of the Office are as follows :

1. To establish a balance between supply and demand of the product, either by withholding stocks or by the free sale of the surplus.

2. To study, to make more widely known, and to apply scientific processes for improving the quality and reducing the cost price of production. For this purpose, the Office has founded in the principal centre of production, Pyrgos, the Currant Industrial and Agricultural Institute, an institution for scientific research and model cultivation. Any lowering of the cost price presents a problem in respect of all the agricultural products of Greece, a country in which new systems have not yet been introduced, but one that calls for special attention in the case of the currant which is grown for foreign consumption, and enters into competition with the same product coming from California and Australia

3. To deposit in store, to control and to handle on the order and on the account of any who may so require, the currant crop belonging to isolated growers, to groups of associated growers, or to dealers ;

4. To safeguard the currants up to the time of their arrival at the consuming market by means of a special export credit system.

5. To systematise supplies and marketing by establishing sample show rooms and depots, on the principal foreign markets. Such depots have already been instituted by the Office in London and in Hamburg.

6. To obtain in favour of Greek currants some modification of rights of importation into the importing countries.

7. To supply chemicals and farm requisites on a collective plan to the growers' associations. The Office pools the orders of the associations of the different localities, then, without deducting any commission for its services, it places a joint order for sulphur in Italy or Japan, for sulphate of copper in England, America or Germany, for later division among the associated growers. These products are unloaded directly at the ports of the vine-growing regions so as to avoid loss of time in delivery to the growers. Such commodities, when intended for the associations, are exempt

from all customs dues. Payment of one-fourth of the value is expected at the time of placing the order by an association and the balance is payable on delivery. Bids for orders is invited by the Office. Payments are accepted and made through the National Bank.

This Bank makes advances to exporters of currants at 11 per cent. interest. These loans may reach the maximum for the three principal grades of currants, 65, 70 or 75 per cent. respectively of the value of the product. They are made in drachmas or in pounds sterling, as preferred by the exporters. Invoices are sent to the National Bank accompanied by a letter authorising the Bank to take all steps to further the transaction and the sale of the currants. These documents are remitted by the National Bank to its London and Hamburg correspondents who in their turn send on the sale orders to the branches of the Office; these carry out the orders without charging any commission.

By this system joint storage facilities have been successfully obtained in the depots of the Federation of Associations, while the London and Hamburg branches of the Office are enabled to handle and effect sales to the best advantage in the common interest.

FARM ECONOMICS

The Condition of Agriculture in the Province of Friesland (Netherlands).

Friesch Landbouwblad, official publication of the Friesian Society for Agriculture Leeuwarden, 20 July and 27 August 1927 — *Handelsberichten*, Doetichem, 7 October 1926, 6 January, 7 April, 7 July 1927 — *Verslag over den Landbouw in Nederland over 1925* The Hague

Since the end of the war, agricultural bookkeeping has made enormous progress in the Netherlands and, in particular, it has been organised by central co-operative associations. The first co-operative association formed for this purpose was established in 1917 in the Province of Friesland under the name of "Coöperatieve Centrale Landbouwboekhouding". This association, as well as most of the associations established later in other provinces, keeps books for its members, works up statistics out of the results and helps its members in preparing returns for the income and property taxes and in making claims, when the quota of taxes has been fixed too high by the tax-officers.

The association publishes every year a report about the results of the farms under survey, as shown by the books. The report for last year shows that the condition of agriculture, which had improved after the post-war depression, has grown worse again. The period for agricultural bookkeeping in the Netherlands is always the twelve months beginning on May 1st, as this period coincides with the fiscal year in respect of which the most important tax, the income tax, has to be paid and it is thought also that the old stocks on this date are very small, new ones do not yet exist and the expenses made for the new agricultural year up to May 1st do not differ largely from year to year.

The report for 1926-27 shows that the average profit per farm was .

•	in 1924-25	3,061 florins
	in 1925-26	1,585 »
	in 1926-27	975 »

In this profit are included all the emoluments the farmer and his family get out of the farm except the free use of the house. Interest on the farmers' own capital used in the farm is not deducted and no deduction is made for

rental value of farms occupied by the owner. Thus the profit is that which interests the revenue authorities (except as far as concerns capital and income independent of the farm), and the real profit, that is after deduction of interest and, in many cases, of rent, would be much lower.

The condition of the purely dairy farms was much below the general average, the average profit for such farms being only 513 florins per farm. For the mixed farms the average profit was 1,712 florins. That this profit is very low will be clear when we see that the average area of the dairy farms is about 30 hectares and of the mixed farms about 35 hectares. Further details which partly explain the bad results, are given in Table I (page 288).

In reading this table the proportion of arable land and pasture should be kept well in mind. For the rest the following explanations (which at the same time will give an idea of the basis on which agricultural bookkeeping in Friesland is done) may be helpful. Gross profit is the fiscal profit which would be made, if all the farmers had their own capital and used no other capital, and did not pay land tax, tax for the maintenance of roads or tax for the maintenance of dykes, canals, etc., and for drainage. The interest on this capital (next column) is calculated on a basis of 5 % of the value of the inventory at the beginning of the year. In the rent is included the estimated rental value of the farms occupied by the owner. The difference between the last two columns and the gross profit is what remains for the farmer. To this should still be added the value of free house. In the first two yield columns the value of what is used again in the farm and what is consumed in the household is not included; this last mentioned value is to be found under "further yield" "Yield live stock" is the yield of the sold cattle minus the expenses for bought live stock plus or minus the difference in the value of the live stock inventory at the beginning and the end of the year. Under "Expenses for wages" no compensation for the work of the farmer and of children under age is made; for the work of the children who are of age 600 florins is generally calculated, when no real wage was paid. Under the expenses only those for bought products are included. In "other expenses" may be found among others maintenance costs or amortisation of buildings, implements, machinery, etc.

The report furnishes further data, illustrating the development of the organisation. The number of members, which in the beginning of the year amounted to 884, rose to 928. Finally may be added that the data are based on the results of 768 farms of which 520 had a fiscal profit and 248 a fiscal loss. In order to understand this unsatisfactory development the following considerations are also of importance.

In the dairy farms the milk is generally brought to co-operative factories which pay in relation to the price of butter and cheese. An important part of the pasteurized separated milk and of the whey is fed to calves and especially to pigs. The percentage of the total cattle which is fattened is much lower on the purely dairy farms than on the mixed farms but the number of pigs is much higher on the dairy farms.

In the mixed farms the most important crops are: potatoes for

TABLE I.—Results shown by Bookkeeping on Farms under Survey
A. Number of Farms, Area, Profits

Agricultural areas	Number of farms	Area in hectares		Net fiscal profit per hectare	Gross profit per hectare	Interest on capital per hectare	Rent per hectare	Balance remaining for the farmer per hectare
		pasture	arable land						total
A. Dairy farms:								
1. in the marsh district	205	5,676	437	6,113	186.98	26.01	169.29	— 8.32
2. in the low fen district.	121	3,432	2	3,434	189.94	24.47	147.70	+ 17.77
3. in the sandy district	145	3,901	242	4,143	144.39	21.90	125.10	— 2.52
B. Mixed farms in the mixed marsh district	300	6,552	4,145	10,697	189.31	20.07	151.96	+ 17.28

B. Yield and Expenses

Agricultural areas	Yield products arable land per hectare	Yield milk per hectare pasture	Yield live stock per hectare pasture	Further yield per hectare	Total gross yield per hectare	Expenses for wages per hectare	Expenses for fertilisers per hectare	Expenses for cattle feed per hectare	Other expenses per hectare	Total expenses per hectare
A. Dairy farms:										
1. in the marsh district .	520.93	307.65	109.03	16.90	441.03	101.14	13.85	88.73	50.33	254.05
2. in the low fen district.	—	296.36	106.55	13.43	416.34	78.20	11.38	94.40	42.42	226.40
3. in the sandy district .	102.20	256.57	122.94	16.47	379.77	78.47	18.27	97.88	40.76	235.38
B. Mixed farms in the mixed farm marsh district .										
	569.66	294.32	124.29	14.85	491.98	147.20	33.73	60.28	61.43	302.67

consumption (in 1925 . 36 % of the total arable land), sugar beet (14 %), flax and linseed (9 %), wheat (7 %) and oats (6 %).

The index numbers for the above mentioned products and for some of the items which have an influence on the cost of production are given below. They are collected by the Department of Agriculture and have as base period 1910-1914. Their agricultural years are not precisely the same as for the bookkeeping records, covering the year from July till June

TABLE II. — *Index Numbers showing Relative Prices of Certain Kinds of Produce and Relative Cost of Certain Items affecting the Cost of Production (Base 1910-14).*

Items	1924-25	1925-26	1926-27
Potatoes for human consumption	190	128	165
Sugar beet	162	156	123
Flax	208	131	114
Linseed	112	78	87
Wheat	153	151	156
Oats	142	132	127
Butter	176	158	141
Cheese	184	165	134
Meat	141	137	114
Pork	140	165	126
Maize	172	143	126
Linseed cakes	136	131	117
Chili nitrate of soda	118	114	114
Sulphate of ammonia.	96	86	79
Superphosphate of lime	116	116	106
Kaunit	89	91	93
Agricultural wages	200	204	204

As far as concerns the quantity of dairy production, 1926 was a very good year but the prices were too low which was caused especially by the great production of the Southern Hemisphere. The prohibition of import of fresh meat in England not only had a very bad influence on the price of pork, but also made necessary a change in the system of fattening pigs. Especially in Friesland (and some other provinces) the pigs were slaughtered young and sent to London. Now it is necessary to fatten them during a longer time, but this changed method is less profitable

THE SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL AGRONOMY AND TEMPERATE CLIMATE CROPS

Effect of Cropping on the Nitrogen and Organic Carbon of Irrigated Soils.

JORDAN, Howard V, *Journal of the American Society of Agronomy*, Geneva, N Y, 1927, Vol 19, No 4, pp 280-284, bibliography.

Investigations on the effect of cropping on non-irrigated lands point overwhelmingly to subsequent decrease in nitrogen and organic carbon.

The present article discusses results of experiments at the New Mexico College of Agriculture and Mechanic Arts on irrigated, brown, medium to coarse-textured, sandy loam soil about 6' deep, average rainfall 8.60".

At the time of sampling some of the soil was still virgin, some had been under alfalfa for periods varying from 2-7 years.

Samples were taken from the surface, and at depths of 7-18" and 18-36" from virgin soil, soil which had been under alfalfa 2-3 years, and soil under alfalfa 6-7 years

The difference between the nitrogen and organic carbon content of the virgin soil and that of soil cultivated for 3 years was very small, the former soil being slightly the richer, but the content in the soil under cultivation for 7 years had risen considerably in every case and greatly exceeded that in the virgin soil.

The increase in organic carbon would seem the result of 2 factors:— (1) the accumulation of leaves lost in harvesting the alfalfa, (2) increased root development especially noticeable under irrigation. The increase in nitrogen was probably largely due to the same forces aided by symbiotic nitrogen fixation, and to a small extent to non-symbiotic nitrogen fixation encouraged by the greater supply of organic carbon.

The conclusion is drawn that where a good rotation including alfalfa is practised on irrigated soils of this kind, the problems of maintaining the supplies of nitrogen and organic matter are not so great as in non-irrigated districts.

Potash Mines in Catalonia, Spain.

COUTURIER A. *L'Engrais*, Lille, 1926, an 41, n° 21, p. 663.

The article contains notes on the potash beds in this region.

Suria Mines. — These mines are situated in the valley of the Cardener, and are worked by the Suria Potash Mines Company. The company has sunk shafts which first pierced 180 m. of marl, then at a depth of from 180 to 250 m. a belt of potash salts and of rock salt including 20 m. of carnallite containing on the average 10 % of K_2O and 8 m. of sylvinite with 20 % K_2O .

The workings are at a depth of 227, 277, 327 metres respectively. The mines are connected by a narrow gauge railway with the station of Manresa, whence the product can be transported to the port of Barcelona.

Cardona Mines. — Investigations undertaken in the salt mines which have been worked from remote ages have proved the existence of potash salts, but their working has not yet begun. Borings have been made by the General Explosives Company

Summarizing the table giving the different potassic horizons discovered by these borings, the potash zone has an average thickness of 70 m., including 6 m. of sylvinite containing on an average 30 % of K_2O , and 20 m. of carnallite with 9 to 10 % K_2O . To this should be added 6 to 7 m. of a mixture of carnallite and sylvinite with a content of 15 to 17 % of K_2O . In all, about 34 m. of potash salts, with an average content of 14.62 % K_2O .

Speaking generally, these salts are poor in sulphate, so differing from the German potash salts and resembling those of Alsace.

The exploitable area of these beds is approximately 330 square km. lying between the following localities: Cardona, Callus, Castelfullit, Villanova de la Rguda.

An estimate of the probable tonnage which could be worked in Suria has been made; in this region alone, the reserve is estimated at 268 million tons of pure K_2O .

Recent Developments in the Preparation and Use of concentrated Fertilisers.

ROSS W. H., MEHRING A. L., MERZ A. R., Bureau of Soils, Washington D. C. *Industrial and Engineering Chemistry*, Washington, 1927 Vol. 19, No. 2, pp. 211-214.

There is a marked tendency at the present time both to use increased amounts of artificial fertilisers and to use them at a higher concentration. Thus the nitrogen in Chile nitrate is increased before shipment from 3 to about 15.5 %, the potash in certain natural salts, from 10-50 %, and the phosphoric acid in the mined phosphate from 20-45 (the last in triple-superphosphate). High analysis, i. e. nutrient material content of 20-30 %,

or concentrated, i. e., over 30 % fertilisers rose in 1926 to 10 % of the total fertiliser output, whereas before the war its percentage had never exceeded 3.

The properties of these concentrated fertilisers are treated under 3 heads, drillability, hygroscopicity, effect on plant growth.

The drillability of a fertiliser varies according to its moisture content, the humidity of the air and the uniformity of its constituent grains. Experiments are at present in progress on possible improvements in this direction.

Hygroscopicity. Differences here are merely one of degree, all soluble salts taking up water when the aqueous vapour pressure in the atmosphere is greater than that of their saturated solutions. Actually, of the salts used, calcium nitrate is the most and potassium sulphate the least hygroscopic.

Suitable treatment of fertilisers depends on the material and may consist of grinding, granulating, forming compound salts, etc. etc.

Effect on plant growth of different fertilisers, at different degrees of concentration, is at present under investigation at the Office of Soil Fertility Investigations, Bureau of Plant Industry. The composition and properties of various new concentrated fertilisers are discussed, especially certain fixed nitrogen products of the Badische Anilin and Soda Fabrik such as Kaliammonsalpeter, Leunaphos etc., etc., as well as such other patent preparations as Ammophos and a new method of preparing potassium nitrate.

Value as a Fertilizer of Solubilized Leather Waste.

JORET Georges and RADET Etienne. *Annales des falsifications*. Paris, 1927, an 20, n° 219, p 133-161.

Many organic fertilizers contain solubilized leather waste in greater or less proportion.

According to the analyses published in this work leather rendered soluble by acid, with phosphate of lime added, contains 45 to 90 % of its nitrogen soluble in water.

Among the properties of leather waste it should be noted that the presence of tannic acid diminishes the value of the nitrogen.

Attention is called to the fact that the determination of the STREET degree by means of permanganate of potassium is misleading as to the value of leather employed as a fertilizer. This results from the nitrification tests made by the writers.

Heat Fermentation of Pen Manure.

F. LÖHNIS, *Illustrierte landwirtschaftliche Zeitung*, 1927. Jahrg. 47, S. 61.

The author's researches show that heat fermentation of pen manure can be strongly recommended in agricultural practice; more and better manure is produced by this method when properly carried out. Moreover, weed seeds and other sources of disease are eliminated, with the

exception of spore formers such as the Anthrax bacillus, by heating to 60°C. for several days. The writer believes that the spread of foot-and-mouth disease can also be diminished by this type of fermentation.

Action of Ammonium Chloride on Plants.

PETIT A. *Revue horticole*, Paris, 1927, an 99, No. 16, p. 398.

The use of ammonium chloride on plants grown on heath soil produced a rapid discoloration and decomposition of the plants under examination. But by merely adding 0.5 % of CaCO_3 to this soil the result on plant growth is nearly as good as that obtained with NaNO_3 though the colour is much paler.

The writer is of opinion that in acid soils the action of chloride of ammonium in the plant liberates chlorine which decolorizes and destroys the aerial part of the plant.

However, the addition of carbonate of lime almost entirely prevents the injurious action of the chloride of ammonium from showing itself. The following are trial results (weight of plants obtained, aerial part) :

	Heath soils	
	in natural state	+ 0.5 % CaCO_3
	gm	gm
Plants without nitrogenous fertilizer	21	60
Plants with nitrate of soda	84	136
Plants with chloride of ammonium	18	126

Development of Japanese Trade in Superphosphates.

Die Entwicklung der japanischen Superphosphatindustrie. *Die Chemische Industrie*, Berlin, 1927, 50 Jahrg. Nr. 16, p. 459-460.

Superphosphate production in Japan, which in 1903 was only 92,000 tons, amounted to 622,000 tons in 1925. The maximum production recorded was 669,000 tons in 1919.

The complete table is as follows :—

Years	Thousands of tons	Years	Thousands of tons
1903	92	1922	511
1907	307	1923	507
1911	282	1924	519
1919	669	1925	622
1921	554	1926	(379)

The phosphates treated are largely imported. The production of raw phosphates in Japan rose to 33,000 tons in 1923 and to 85,000 tons in 1924. In 1925, more than 300,000 tons were imported. A great part of the phosphates used come from Rasa Island ("Rasa Phosphorit-Gesellschaft").

The Inter-Relation between Silicon and other Elements in Plant Nutrition.

BRENCHLEY, W E, MASKELL, E T, WARRINGTON, K (Rothamsted Experimental Station) *The Annals of Biology*, London, 1927, Vol XIV, No 1, pp 45-82, 21 Tabs, illust.

The writers discuss previous work on the subject of silicon and its effects and functions in plant growth. Thus PIERRE showed that the presence of silica in large quantities did not prevent lodging, the bulk of it being not in the nodes but in the leaves.

HALL and MORRISON considered that the increased and earlier grain formation in the presence of silica is due to increased assimilation of phosphoric acid within the plant induced by the silica. LEMMERMANN and WIESSMANN stated that increase in yield was induced by silicon in presence of insufficient phosphoric acid. Later these two in conjunction with SAMMETT stated that silica does not replace but indirectly increases the amount of phosphoric acid which can be taken up from the soil and the efficiency of its utilization.

NANJI and SHAW, on the contrary, consider that silica can actually replace phosphoric acid.

The present Rothamsted experiments are primarily for the purpose of determining whether the use of silicates as supplements to other forms of fertilizers may be an economic proposition.

Their conclusions are as follows:—

(1) Under controlled conditions in water cultures soluble silicate had little effect on the growth of barley in the presence of phosphorus, whereas in its absence it induced a significant increase in dry weight.

(2) Added silicate appreciably increased the height of the main shoot especially in phosphate free solutions and to a less extent as phosphate was introduced increasingly.

(3) Leaf development was retarded by phosphate deficiency and hastened by added silicate.

(4) The amount of phosphate present and the effect of silicate on the rate of tillering and numbers of tillers are closely connected.

(5) Soil cultures with barley and mustard in pots showed that soluble are more active than glass silicates, and tend to cause increased dry weight with deficient mineral manuring and sometimes with full manuring.

(6) The response of the above two crops to silicates varied on different types of soil. Notably when phosphorus or potash were deficient a general improvement occurred with increasing doses of silicate in conjunction with various combinations of manures.

(7) The meaning of the results is examined statistically and an attempt made to formulate the effect of added silicate in terms of an increase in the efficiency of the phosphate present.

Unusual Appearance of a Smooth-awned Barley in Morocco.

MIEGE E. *Comptes Rendus de l'Académie des Sciences*. Paris, 1927, n° 12, p. 762.

A pure Gulkorn barley (*Hordeum distichum nutans* L.), which has been the object of comparative pedigree growth investigation at Rabat, at sea-level, and at 1000 metres above sea-level since 1921, produced in the mountain station a plant whose ears were covered with perfectly smooth awns although the rest of the crop continued to have definitely spiked awns. The seed of the two categories was sown simultaneously at Rabat and in Moyen Atlas.

The plant with smooth awns which appeared suddenly in 1924 produced wrinkled plants in the first generation in both stations. The spiky character of the plant has been especially noticeable along the sea coast. The writer describes certain characters which accompany the loss of spikes in the awns, especially the increase in length of grain and the fragility of the awns, of the length and fragility of the glumes, of the size of the stalk, of the grain, etc.

The writer is of opinion that the ecological factors and the annual climatic conditions influence the mutation of these characters.

The Inheritance of Length of Style in Buckwheat.

GARBER, R. J. and QUISENBERRY, K. S. (Agricultural Experiment Station of West Virginia University) *Journal of Agricultural Research*, Washington, D. C., 1927, Vol. 34, No. 2, pp. 181-183.

The inheritance of style length in *Fagopyrum esculentum* is apparently controlled by a single-factor difference, short styles being dominant to long styles.

Self-Fertilization in Buckwheat.

GARBER, R. J. and QUISENBERRY, K. S. (Agricultural Experiment Station of West Virginia University). *Journal of Agricultural Research*, Washington, D. C., 1927, Vol. 34, No. 2, Pp. 185-190, 1 fig., bibliography.

Several varieties of *Fagopyrum esculentum* and *F. tartaricum* were self-fertilized. Varieties of the latter proved much more highly self-fertile than varieties of the former. Large glassine bags and muslin cages

are the most satisfactory methods of covering the flowers and in inducing self-fertilization. Short-styled plants of *Fagopyrum esculentum* are somewhat more self-fertile than long styled plants.

Relation between Fruit Size and Abscission of Young Orange Fruits.

HAAS A. R. C. (Citrus Experiment Station, Riverside, California). *The Botanical Gazette*, Chicago, Ill., 1927, Vol. LXXXIII, No. 3, pp. 307-313.

Young citrus fruits are liable to abscission at the beginning of summer heat, if they have not reached a certain size; therefore any climatic conditions, scheme for using fertilizers or cultural operations, that may hasten the setting and sizing of the fruits, may give them a better opportunity to remain attached to the tree up to the time of ripening.

The writer has also observed that the percentage loss of moisture decreases as the fruits increase in size, while stomatal regulation or the nature of the rind has very little influence in determining the rate of water loss from detached fruits of different sizes.

Influence of Size of Seed-Grain on Crop.

KORSMO E. Kornstørelseforsøk Forsøk, undersøkelser og iakttagelser til belysning av spørsmålet stor- eller småkornet såvare i planteproduksjonen. — *Meldinger fra Norges Landbrukshøiskole*, Oslo, 1927, Vol. VII, No. 3-6, pp. 299-374 (English Summary pp. 366-367).

The experiments included sowings of grain of 4 different sizes of spring wheat, 6-rowed barley and oats in 2 rows of each sort of corn.

Row A : sown with equal quantities by weight of the different types.

Row B : sown with equal numbers of grains of the different types.

1. In all the experiments the largest grain gave rise to the largest crops. The crop decreased evenly with decreasing size of grain, this phenomenon being especially noticeable in Row B.

2. The sowing of larger grain resulted in better germination, resistance to disease (smut) during growth and ripening, and finer quality crop than did that of smaller grain.

3. After sowing equal quantities by weight of the different sized grains — row A — the number of germinating plants and stems per square foot increased with decreasing grain sizes, but the greatest crops were obtained where the grains sown were largest. The size of crop is thus shewn to be largely independent of the density of the plants.

4. At harvesting the ratio of number of plants to number of grains sown was highest for the largest grains and decreased evenly with decreasing size of grain.

5. The number of stems per plant at harvesting was less than is usually found in practice.

Tillering is largely determined by the density of planting and increases with decreased density of planting.

The experiments show that size and quality of the seed corn affects tillering to a less degree.

6. The productiveness decreases evenly with decreasing size of grain in row A; it increases in row B, where the weight of the seed-corn decreases with decreasing size of grain.

7. Unfavourable external factors of growth considerably influenced the crop, their effect increasing with decreasing size of grain sown.

8. On comparison of experimental rows, where one row during the period of growth was kept free from weeds by weeding, the other not, the plants grown from large sized grains proved better able to cope with weeds than the others, — while the weeds appeared to increase in vigour in proportion to decreasing size of seed-corn. This is applicable to all three sorts of corn used in the experiments, viz.: spring wheat, barley and oats.

Maize Trials at Salisbury, Rhodesia.

ARNOLD, H. C. *The Rhodesia Agricultural Journal*, Salisbury, 1927, Vol. XXIV, No 5, pp 520-534.

This is the annual report from the Salisbury Experimental Station on results of maize growing under different conditions.

Continuous maize: Although the yield this year owing to ideal conditions of rainfall shewed a great increase over that of the previous year, it amounted to little more than half that of 1920-21.

Maize and Sudan grass i. e. Sudan grass grown 1 year out of 4 and stubble ploughed in, and each year $\frac{1}{4}$ of total area receives 8 tons of dung per acre.

Maize and Velvet Beans (*Stizolobium*). Velvet Beans 1 year out of 4 and ploughed in, and each year $\frac{1}{4}$ of area receives 150 lbs. of bone and superphosphate per acre.

Both these systems show great advantages over that of continuous maize.

Maize after various types of crop. — This experiment, in progress now for 6 years, continues to demonstrate the great superiority of leguminous crops as preceding crop. They are followed in descending order of value by oil seeds, grass crops and miscellaneous crops.

Green manuring by 1 mature as again 2 immature crops. — Results have

favoured the mature crop on the average and in each particular case, though both systems do good.

Maize and velvet beans for grain. — Trials show the great influence of weather on this combination. Thus, in the presence of excessive rain velvet beans suffer worse than when alone, while, when rainfall is deficient, a moderate crop of beans results but the maize yield is considerably reduced. Very fertile land induces difficulty in harvesting the maize owing to intertwining bean tendrils. On somewhat exhausted land the combination is satisfactory. Naturally the soil is in better condition afterwards than after maize alone.

Maize check-rowed versus drilled. — This year's results confirm previous results showing that if anything drilling is the more suitable process.

Maize spacing. — The averages of several seasons suggest that 36 " is a better distance to have between rows than the normal 40 ".

Variety Trials. — Salisbury white and Potchefstroom Pearl head the average yields for 6 years

Maize following green manure crop sown under Maize previous year. — Various leguminous plants such as Soya Bean, White Jack Bean, Khaki Jack Bean, and Dhal, were planted under growing maize and ploughed in before planting the 2nd and immediately following crop of maize. The effect on the 1st maize crop was slightly harmful, that on the 2nd crop was in every case extremely favourable, yields far exceeding those on the control plot where no similar green manuring had been practised. It is noted however that the heavy rains of March and April 1925 favoured the leguminous plants and enabled considerable growth, whereas a normal year would not induce it to the same extent.

Use of the Juice of Prickly Pear in Copper Salt Sprays.

VIVET, E. Emploi de l'extrait de figuier de Barbarie pour la préparation des bouillies cupriques. *Revue agricole de l'Afrique du Nord*, Algiers, 1927, an 25, n° 402, p. 226-228.

The use of the fruit of the prickly pear for making copper anti-fungus sprays more adherent is spreading in North Africa.

The fruits are cut into pieces with a spade and the pieces about the size of a walnut are put to macerate in the copper sulphate solution, 300-400 gm. for 24 hours (in 1 hectolitre of solution).

Or for greater speed, the prickly pear can be crushed in a wine press, or maceration in water may be carried out and the product added to the copper solution.

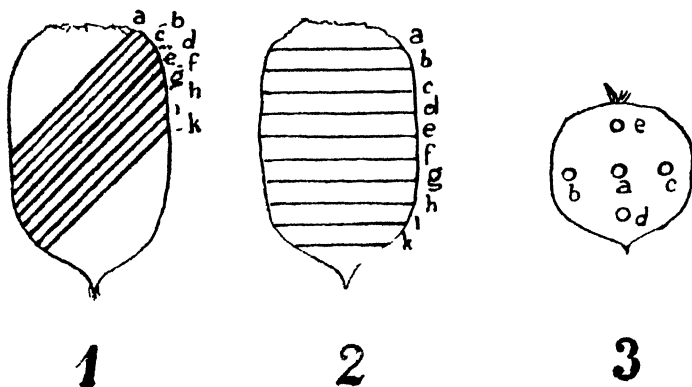
Care must be taken not to add an excessive amount of juice and thereby choke the jets of the spray. The right amount can be determined by trial.

Distribution of Sugar in Different Shaped Species of Beets.

BECKER Joseph, Die Verteilung des Zuckers in den verschiedenen Formen der Runkelrübe. *Fortschritte der Landwirtschaft*, Vienna, 1927, 2. Jahrg., Nr. 5, p. 143-147.

A series of determinations of dry matter and sugar is here given for various shapes and varieties of beets, the samples being taken with a scoop as shown in the annexed illustrations —

Fig. 1. 10 test holes on the slant to the root's axis; Fig. 2. 10 test holes perpendicular to the axis, Fig. 3. (a) 1 central test hole along the



Method of taking the samples for analysis.

Fig. 1 — Samples taken at an angle of 45° to the axis.

Fig. 2 — Samples taken perpendicular to the axis

Fig. 3 — Samples taken parallel to the run of the root.

axis, from the collet to the tip of the root, (b) and (c) test holes from the collet to the tip of the root, in the intervals between the rootlet grooves, (d) and (e) test holes from the collet to the tip near the rootlet grooves.

The annexed tables give the average percentages obtained for some varieties of mangels, semi-sugar beets, and sugar beets, with in each case the method of procuring the samples (1-2-3), the letters showing the various test holes (a, b, c, d . . .).

TABLE I. — *Cylindrical Mangels.*

Variety "Original Crieewener Beckendorfer "

	1		2	
	dry matter	sugar	dry matter	sugar
a	7.5 %	3.9 %	7.2 %	3.8 %
b	7.2	3.3	7.5	4.2
c	7.3	3.1	7.1	3.5
d	6.8	2.7	6.7	3.5
e	6.5	2.6	6.5	3.2
f	6.4	2.4	6.2	2.5
g	6.6	2.6	6.3	2.9
h	6.8	3.3	6.7	3.4
i	7.3	3.8	7.5	4.6
k	7.8	4.8	8.2	5.7
Average . .	7.0	3.2	6.9	3.7

	3	
	dry matter	sugar
a	7.0 %	3.8 %
b, c	6.9	4.1
d, e	7.0	4.3
Average . . .	6.9	4.1

TABLE II. — *Ovoid Mangels.*

Variety "Original Remlinger "

	1		2	
	dry matter	sugar	dry matter	sugar
a	7.9 %	4.9 %	8.2 %	5.1 %
b	7.7	4.9	8.3	5.7
c	7.8	5.0	8.1	5.4
d	7.6	4.4	7.8	4.9
e	7.7	4.2	7.3	4.3
f	7.6	4.8	7.4	4.2
g	7.7	4.6	7.7	4.5
h	7.9	5.0	7.7	5.2
i	8.3	5.3	8.4	6.0
k	8.4	5.8	8.9	6.6
Average . . .	7.8	4.8	7.9	5.1

	3	
	dry matter	sugar
a	8.2 %	5.3 %
b, c	8.4	5.6
d, e	8.7	5.9
Average . . .	8.4	5.6

TABLE III. — *Long Mangels (Mammouth).*

Variety "Original Loosdorfer Austria" (red)

	1		2	
	dry matter	sugar	dry matter	sugar
a	8.6 %	5.2 %	10.1 %	6.6 %
b	8.4	5.2	10.2	7.0
c	8.7	5.9	10.3	7.1
d	8.9	6.3	10.4	7.5
e	9.1	6.2	11.0	8.1
f	9.5	6.9	11.2	8.3
g	9.7	7.2	11.6	8.9
h	10.1	7.2	11.9	9.3
i	10.7	8.4	12.2	9.7
k	11.2	8.9	12.4	10.0
Average . .	9.4	6.8	11.1	8.2

	3	
	dry matter	sugar
a	10.2 %	7.2 %
b, c	10.8	8.7
d, e	10.3	9.2
Average . . .	10.6	8.3

TABLE IV. — *Semi-sugar beets.*

Variety "Rose du Nord "

	1		2	
	dry matter	sugar	dry matter	sugar
a	9.1 %	5.7	10.4	7.4
b	9.8	6.1	9.6	7.1
c	9.1	6.5	9.3	6.6
d	9.4	6.9	9.5	6.9
e	9.9	7.3	9.8	7.2
f	10.2	8.0	10.1	7.9
g	10.5	8.1	10.3	8.1
h	10.9	8.6	10.6	8.3
i	11.4	9.1	10.7	8.3
k	12.0	9.9	11.0	8.8
Average . .	10.2	7.6	10.1	7.6

	3	
	dry matter	sugar
a	10.1	6.9
b, c	9.9	7.4
d, e	10.4	8.0
Average . . .	10.1	7.5

TABLE V. — *Sugar-beets.*

Variety "Kleinwanzlebener E"

	1		2	
	dry matter	sugar	dry matter	sugar
a	18.8	14.8	19.4	15.6
b	18.4	14.7	19.1	15.3
c	18.6	15.6	18.9	15.0
d	19.0	16.3	19.5	16.0
e	19.6	16.9	19.9	16.4
f	19.6	16.9	20.1	16.9
g	21.3	17.8	20.1	16.7
h	20.0	16.9	20.1	17.1
i	20.2	17.1	20.4	17.4
k	20.2	17.1	20.3	17.3
Average . . .	19.4	16.4	19.7	16.3

	3	
	dry matter	sugar
a	22.2	17.0
b, c	22.2	18.5
d, e	22.5	18.6
Average . . .	22.3	18.0

The following conclusion can be drawn from these analysis tables:—

On the average the smallest percentage in sugar is given by the samples obtained near the top end of the root.

The average percentage is obtained from the following samples for the different types of beets tested:—

	1	2	3
Cylindrical "Crieuener Eckendorfer"	h	a h	b/c
Ovoid: "Remlinger"	g h	h	b/c
Long. "Loosdorfer rote Austria"	f	e f	b/c
Semi sugar beets: "Rose du Nord"	c	f	b/c
Sugar beets: "Kleinwanzlebener"	d e	e	b/c

Composition of Honeydews.

SCHOORS F. *Bulletin de la Société chimique de Belgique*, Ghent, 1927, an. 6, n. 2, p. 119-123.

The viscous sugary secretion ("honeydew") which exudes from the leaves of certain trees or shrubs is particularly abundant during dry weather and the extreme heat of summer. It appears in the form of a thin,

sticky glaze on the upper surface of the leaves or else in small white masses somewhat resembling crystallised sugar. Sometimes it is so abundant that it falls as a white dust in very dry weather; but if the air is damp, it melts and forms droplets.

This secretion has been observed on the lime, black alder, maple, rose, plum, oak, *Tamarix mannifera*, etc.

The writer has made a detailed chemical analysis of honeydew from a beech and intends to carry out a similar analysis on other samples in order to have an accurate idea of the nature of the constituent elements.

Analysis of the Honeydew of a Beech (SCHOORS).

Substances soluble in petrol ether (fats, etc.) . .	0.097 %
Impurities insoluble in water (vegetable debris)	3 190 %
Matter soluble in concentrated alcohol	2 200 %
Matter insoluble in dilute alcohol at 85° (dextrin, gummy matter, etc)	56 142
Mineral matter	2 294 %
Albuminoid matter (Kjeldahl)	2 984 %
Reducing sugar (expressed as dextrose) . . .	14 160 %
Saccharose	2 605 %
Melting point of the glucosazone	204 5°C

The melting point of the glucosazone shows that dextrose predominates.

The author also calls attention to the following analyses, which are interesting for purposes of record

BOUSSINGAULT (*C R Acad des Sciences*, Paris, 1872) *Lime Honeydew* .

	July 22	August 1
Cane Sugar	48 86 %	55 44 %
Invert sugar	28 59	24.75
Dextrin	22 53	19 81

KREIS (*Chemiker Zeitung*, 1906, p 1061) —

Invert sugar	19.1 %
Saccharose	9.7 %
Dextrin	40.1 %

KREIS calls attention to the probable presence of mannite

KÖNIG (*Chemisch. Zeitschr. Menschl. Nahr. u. Genussmittel* I, p.926):—

Glucose	16.70 to 43.80 %
Saccharose	28.5 to 55.40 %
Dextrin	16.14 to 39.40 %

MAQUENNE has also discovered the presence of melezitose and estimated its proportion at 40 %.

Factors producing Mottling in Soya Beans.

OWEN, F. W., *Journal of Agricultural Research* Washington, D C., 1927. Vol. 34, No. 6, pp. 559-587, 1 Plate, 8 Tab, 4 Fig, bibliography.

Mottling has been considered as a hereditary character denoting genetic impurity. For this reason the International Crop Improvement Association has recommended that mottled soya beans be tolerated only to the extent of 1 % in certified seed.

The above study was made to determine whether such a theory is justifiable and to ascertain more clearly the identity of the factors which determine mottling.

Pigments producing mottling. — The chief pigments are black and brown. They are glucosides whose production possibly depends on the accumulation of sugars, the most striking evidence in support of this being that mottling was observed to increase greatly following a revival in growth of the plant after the seeds were practically mature.

Environmental Factors. — The distribution of mottled seed on the plant was found to be extremely variable. Striking resemblances were found among seeds on the same plant, but all indications pointed to the cause being physiological rather than hereditary.

An examination of the distribution of mottled seed within the pod shows that seeds in any one pod always tend to be mottled to the same degree and emphasizes the delicate balance in nutritional conditions which may control pigment formation.

Studies on the result of abnormal physiological conditions were inconclusive except as showing that mottling is not necessarily determined by the amount of food material present.

The amount of nitrogen in the habitat did not seem to effect mottling uniformly.

In the same way, on certain types of soil mottling was entirely determined by the distance of spacing, being much less when spacing was less, whereas one rich soil under experiment caused mottling even on closely spaced plants

Experiments with various fertilizers were inconclusive and the actual correlation between nodule formation and mottling, which would appear to exist, is not yet determined.

All attempts to reduce mottling by shading in the open field failed.

Heredity in Relation to mottling. — Selections against mottling were made with varying and only partial success, though it has been found possible "to select for strains that are more inclined to mottle than others".

Experiments were also made on selecting for pigmentation patterns, on the relation between the colour of pubescence and mottling, on cross-fertilization and on the extent of natural hybridization.

Conclusions. — Mottling is sometimes due to environmental factors. The accumulation of a large amount of synthetic material by the plant cannot be the sole cause.

The maturation of the seed may be an important factor in the production of mottling.

Where heredity alone controls, as in the case of black and brown varieties which breed true under all conditions, other factors conducive to pigment formation are obscured. Otherwise heredity would appear to afford merely a greater or less faculty for the achievement of mottling.

Further experiments may well prove that the aim of this investigation should be the determination, not of the causative factors of mottling, but of the inhibitive factors preventing mottling.

Summer and Winter Fallowing Competitions in Victoria.

MULLETT, H A., B Ag Sc, *Journal of the Department of Agriculture of Victoria*, Vol XXV, part 4, pp 223-227 and 242-247

Competitions were held at Nhill in 1924-1926 largely with a view to testing the merits of summer and winter fallowing

Each competitor was required to summer fallow 10 acres, and to winter fallow 10 acres alongside on a site specially selected for its uniformity. The same variety of wheat (Federation) was sown on or about the same day at the same rate of seed and manure. The produce from the separate plots of every farm was checked.

The scale of points and method of judging the crops and fallow were normal, the lay out of the field, the general conduct of the experiment, the drilling etc, being also taken into account

In the 1925 harvest the summer fallowed crops averaged a return of 2 bushels 42 lbs an acre greater than those winter fallowed. In 1926 the differences though not so great averaged nearly 1 ½ bushels per acre

Over the 2 years on the 14 plots, where all the conditions were satisfactorily fulfilled, positive increases were obtained in 12 cases for summer fallowing, and in the other 2 the differences were either negligible or due to special other circumstances.

The final winner's exact arrangements were: The land destined for

summer fallow was ploughed at the end of March, harrowed in early July, scarified a week later. In August it was spring-toothed and again in September. After rain in November it was lightly harrowed. The next operation was spring-toothed after rain in April. It was harrowed mid-May and sown on 10 June at 1 $\frac{1}{4}$ bushels p. a. along with 1 cwt. of 24 % supers. Four days afterwards it was harrowed, and it was sheep-ed at the end of July. The winter fallow was ploughed in July, harrowed at once and afterwards treated exactly as above.

Differences were apparent to the naked eye throughout the growing period, the summer fallowed crops being better stooled, denser, taller and slightly later maturing. These differences are due to the better supplies of moisture and plant food conserved in the soil by the long fallow.

The crops under consideration were all grown on fairly weed-free ground. Otherwise the differences must have been even greater.

In conclusion the writer stresses the advantages of this 14-15 months fallow on wheat farms on loamy land where as in Victoria the question of sufficient water is a serious one. The system should not embrace the whole farm, but when practised on part, it allows of a good distribution of labour.

It should not be used on hard soils nor those waterlogging in winter nor on such soils as are found in the Mallee sand hills, where sand is likely to be blown away, but on such soils as the black clay loams of the experiments it will amply repay the trouble and delay involved.

Birds'-foot Trefoil.

SCHREIBAUX *Comptes rendus de l'Académie d'Agriculture de France* Paris, 1927, n° 9, p. 294-301

New notes on the advantages of growing *Lotus corniculatus* on dry calcareous soils and on poor reclaimed moorland.

Birds-foot trefoil was grown at Dampierre (Aube) on dry calcareous soil and after initial difficulties in the first years 1923-1925 yielded an excellent crop in 1926, better than those of lucerne and clover. Moreover on harvesting the trefoil it was found possible to thresh out as well a considerable quantity of seed which was sold at a profit.

The trial which was made on 14 ha. has been extended to 55 ha. The farmer who has undertaken growing trefoil is carrying considerably more cattle and sheep on his farm.

The second experiment reported was made in Brittany on soil suitably manured with 800-1000 kg. of slag and 80-100 kg. of potash (400-500 kg. of high grade sylvinite) per ha.; 10-12 kg. of trefoil seed was sown together with 6-8 kg. of cocksfoot, to act as a shelter crop. The trefoil

was sown in rows and hoed during its early growth for protection against weeds.

The two cuts in the first year yielded a crop of 30,000 kg. per ha.

The farmer who has carried out this trefoil cultivation considers that this plant ought to be very useful as a fodder crop there also.

The writer recommends its generous use in seeds' mixtures.

M. MARTINET has grown many lines of selected trefoils at the Lausanne Experimental Station, the spread of which will be of the greatest benefit to agriculture.

The "marsh" variety is described as being valuable for wet soils

Harvesting Fodder Crops. Use of Driers.

PLUCHET, Eugène. *Comptes rendus de l'Académie d'Agriculture de France*, Paris, 1927, No 15, p. 500-502

The use of automatic driers gives excellent results on the drying of seeds' hay.

The driers described consist of a shaft of wood 3 m high provided with 7-8 jointed arms which can be folded back. It is fixed into the ground by its pointed end. The fodder cut by the mower is left in swathes for 24 or 36 hours and is then put on the driers, about 1000 kg. fodder being about the load of one. One hectare requires 12-15 driers. Drying is complete in 5-8 days and the serious loss of fodder experienced in hay-making especially by a leguminous crop is avoided and there is also a great saving of time and labour. Farmers and labourers who have tried the system prefer it to any other.

Losses in Silage-Making at the Albert Agricultural College, Ireland.

DREW J. P. and PYNE G. T. *Department of Land and Agriculture Journal*. Dublin, 1927, Year 26, No. 3, pp. 208-214.

Experiments made to ascertain the losses in silage-making under Irish conditions.

Investigations were made regarding :— (1) mixed "tillage" type of silage in which the crop consists of a mixture of peas, vetches, and oats, (2) a grass silage.

The following results have been obtained from the various experi-

ments, in which many chemical analyses have taken place, with the determination of the loss of weight, etc. :—

(1) In the first case (the ensiling of a mixed crop with an average dry matter content of about 22.5 %) about 12 % of the dry matter is lost and about 21 % of the total weight.

(2) In ensiling a grass crop (average dry matter content about 37 %) about 6-7 % of the dry matter is lost. The lower loss in this case would appear to be due to the very slight drainage from the silo, owing to the drier condition of the ensiled material.

TROPICAL AGRICULTURE

Mould on rubber.

VRIES Dr O de Beschimmelen van Rubber *Archief voor de Rubber-cultuur in Nederlandsch-Indië*, vol 11, n^o 7, p 262-283 Buitenzorg, 1927. (With an English summary).

Surface mouldiness on rubber, which is only dry on the surface and more or less wet in the interior, has no influence on the inner properties. The time of cure is increased, but there is no change in slope and only a small decrease in tensile strength. The ordinary effects of maturation in wet rubber (increase in rate of cure and viscosity, decrease in slope) do not come to light, these effects having evidently been blotted out by the inverse changes caused by the mould. Samples of moulded rubber, kept for eight years, were still in good condition, without tackiness or decay; real deterioration due to the moulds was not traceable.

In smoked or unsmoked sheet surface mould causes an important loss in weight (after 40 days about 4 %, after 19 months 7 ½ %, after 2 years 22 ½ % etc.). The greater part of this loss consists in volatile compounds which have evaporated, the mould and refuse only 1-6 %.

The ash content was in the beginning slightly smaller in the moulded rubber, but after 5 years there was an increase. The mould had caused no appreciable change in watery extract, acetone extract or nitrogen content. The chemical composition is about the same. The viscosity is slightly decreased, but only after 5 years was the decrease appreciable and the rubber had become slightly sticky. The differences in plasticity were very small.

Mouldiness during two years or less does not cause any difference in the inner properties of the rubber. After 5 years mouldiness there is an increase in slope and a decrease in tensile strength, therefore a decline in quality. Vulcanisation time increases about 25 %. The keeping power remains the same, only after 5 years mouldiness the rubber shows a decline in this respect.

The general conclusion is : two years or less under mould practically does not cause any deterioration in the rubber, five years under mould gives a decided deterioration in all respects.

Preliminary Report on Tapioca Varieties grown at the Government Plantation, Serdang.

LAMBOURNE, J. *The Malayan Agricultural Journal*, Kuala Lumpur, 1927, Vol. XV, No. 2, pp. 41-59.

With a view to an increased production of the Tapioca or Cassava Plant (*Manihot utilissima*) cuttings of reported good yielders were introduced

by the Dept. of Agriculture F. M. S. and S. S. from the Philippine Islands and Java.

This report describes the present results of trials for several years on these varieties.

Details are given of results of trials of the same varieties when grown in the Philippines and in Java respectively.

In the Philippines Kapo green, Mandioca Basiorao, Aipin Valenca. and Aipin Mangi are said to be the best for sweetness, cooking capacity (for use as a vegetable), and for fineness of texture. They also give a good yield.

For commercial manufacture of starch and flour Aipin Valenca, Mandioca Basiorao and Mandioca Sao Pedro Preto are best.

In Java Mandioca Sao Pedro Preto is the best yielder with Mandioca Criolinha second and Aipin Valenca the worst. These results agree with those from the Philippines.

The report deals in turn with (a) yields from Philippine varieties in the Nursery, (b) yield trials with Philippine and Native varieties, (c) yields from P. varieties when used as a catch crop among African Oil Palms, (d) yields from Java varieties in trial with Native varieties, e) yields from Java varieties in the Nursery.

The tables show that, generally speaking, the yields of the particular varieties obtained at Serdang compare favourably with yields obtained in the Philippines and the yields obtained with Java varieties planted at Serdang under nursery conditions compare favourably with those obtained in Java, though where these last have been planted on a large scale they have not done so well, possibly owing to poverty of soil on the plantation. The native varieties have yielded about 100 piculs per acre for the 1st crop as against the highest recorded yield, viz. 190 piculs by P. Aipin Mangi when grown among the oil palms.

The usual yield in Malay on good land varies from 175-200 piculs per acre for the 1st few crops.

Out of 10 trials Mandioca San Pedro Preto and Aipin Mangi gave the best yield four times each, while M. Basiorao headed the list on the other two occasions.

A description of the lay out of the trials and of the various varieties tested and a classification according to their tuber characters are given.

The trials are being continued.

On the Occurrence of Hydrogen Cyanide in *Hevea*.

BOBILIOFF, W. Onderzoekingen over het voorkomen van cyaanwaterstof by *Hevea brasiliensis* (with an English summary). *Archief voor de Rubbercultuur*, Buitenzorg, 1927. Vol. 11, No. 5, pp. 177-183.

The occurrence of HCN in *Hevea* was investigated by different chemical and microchemical methods. It was found that this substance occurs principally in the chlorophyll cells and in the latex vessels of these young parts.

The Separation of "Kernels" and Shells in the Oil Palm Industry.

VAN HARPEN, N. H. De scheiding van kernen en steenschalen in het palmoliebedryf *Mededeelingen van het Algemeen Proefstation der A V R O. S* Algemeene Serie, No 30 Medan, 1927.

Different methods of separating kernels and shells in the oil palm industry and different kinds of separators are described. A more detailed description is given of a new separating machine constructed by the A. V. R. O. S. Experiment Station. This new separator works very satisfactorily by means of a suspension of clay, in which the kernels go down and the shells rise to the surface.

The Germination of Tobacco Seeds in Solutions of different Hydrogen-ion Concentration.

VAN DER POEL, J Over het kiemen van tabakszaad in vloeistoffen van verschillende zuurgraad *Mededeelingen van het Deli Proefstation*, Serie II, no 47, Medan 1927.

Tobacco seeds germinate well in hydrogen-ion concentrations varying from 5.6 to 7.8

The Shrinkage of Deli Tobacco during Drying.

VAN DER POEL, J Het krimpen van Deli-tabak by het drogen *Mededeelingen van het Deli Proefstation*, Medan, 1927, Serie II, no 46

The average shrinking of Deli tobacco during the drying process is 8.5 % for the length and 15 % for the breadth. The lower leaves shrink more than the higher ones. The shrinkage is greater when the weather is rainy before the harvest.

Composition of the Java Sugar Cane Fields in 1927.

VAN HARREVELD, J, De samenstelling van den aanplant 1926-1927 en de planttyd der oogstjaren 1926 en 1927 — *Archief voor de Suikerindustrie in Nederlandsch-Indie* Mededeelingen van het Proefstation voor de Javasuikerindustrie Soerabaja, 1927, Jaargang 1927, no 3

Of the different varieties planted the varieties "EK 28" and "DI 52" are still by far the two most important ones (35 $\frac{1}{4}$ % and 26 % of the whole area), but their importance is diminishing. The new varieties of the Experiment Station, especially "2878 POJ" (12 $\frac{1}{2}$ % of the whole area) and other "POJ" varieties (altogether 10 $\frac{3}{4}$ %) are coming to the front

Soil Reaction and Growth of Sugar Cane in Java.

ARRHENIUS, Dr. O., Een orienteerend onderzoek over den zuurgraad van de suikerrietgronden op Java. *Archief voor de suikerindustrie in Nederlandsch-Indië*, Soerabaja, 1927, No. 6, p. 207.

This investigation has shown that the soil reaction of the different cane soils varies greatly. Generally speaking East Java with its arid or semi-arid climate is much more alkaline than West Java with its humid climate.

A comparison of the yields of the different factories and the reaction of their soils shows that the more acid soils give a lower yield than the neutral and alkaline soils. But it may be that this difference in yield is not entirely due to the reaction of the soil and that both are the consequence of the amount of rain and the leaching of the soil.

All acid (below 7) Java soils are practically deficient in lime carbonate, very acid soils (below 6) almost always show a very low content of phosphoric acid.

It is very probable that both lack of food materials and too high acidity are the causes of the low yield of cane on acid soils.

Soil acidity determinations may be of great practical value as a means towards soil improvement. Acid soils may be eliminated.

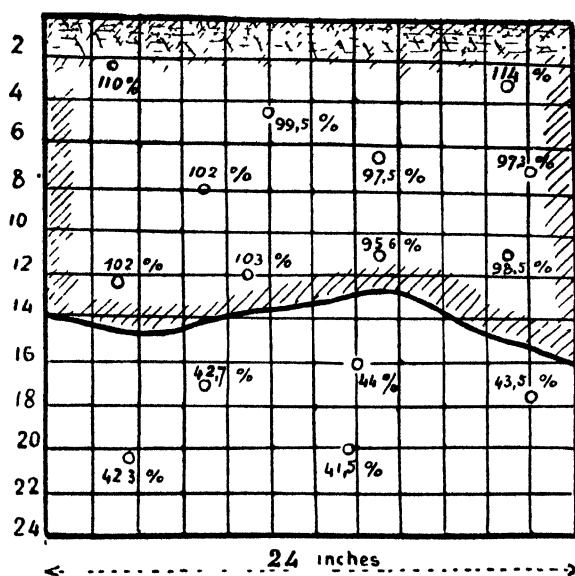
AGRICULTURAL ENGINEERING

Irrigation in Relation to Soil Moisture and Plant Growth.

VEHMEYER F. J. *Agricultural Engineering*, St. Joseph (Michigan) 1927.
vol. 8, No. 5, pp. 109-111.

These studies on soil moisture, its capillarity and evaporation as affecting the reaction of certain plants, have been made under California weather conditions.

Records taken from experiments under humid climate conditions



Penetration of Rain in the Soil.

Abscissae: Breadth of soil.

Ordinates: Depth in inches.

- oooo = Points from which soil samples were taken with indication of moisture in %.
- = Line separating moistened soil from dry soil.

show that much of the rain, which falls on the soil, is returned to the atmosphere by evaporation, and hence does not penetrate deeply into the soil.

Under arid or semi-arid conditions in the West of the U. S. A., rains usually come when atmospheric evaporating power is low, and the rain-

fall, even though slight in amount, is able to penetrate into the soil to considerable depths.

As regards capillarity, it has been observed that when soils are not in contact with free water, capillary movement is extremely slow in rate and slight in extent.

Experiments were made also to determine the loss of moisture by evaporation in a series of tanks containing from $\frac{1}{2}$ to $\frac{3}{4}$ tons of soil. In these experiments determinations were made for the loss by evaporation of irrigation water on soils regularly submitted to cultivation processes and those left untouched and the loss by transpiration due to growing plants.

It was noted that cultivation has a negligible influence on the amount of evaporation. On the other hand the loss of water by transpiration from growing plants is considerable.

Evaporation is rapid and considerable during the first 5 days following the application of water.

The determinations of the loss of the soil moisture were made also at different depths, different periods and different points.

The results are given in the following tables:—

TABLE I. — *Average Losses of Moisture by Evaporation in Pounds per Square Foot from the Surfaces of Bare Clay Loam Soil in Tanks. Water Applied to the Soil on August 17, 1921.*

Treatment of Soil	August			September			Oct- ober	Novem- ber	
	25	27	29	10	16	24	8	1	4
Undisturbed except to pull weeds.	4.6	5.0	5.4	6.8	7.4	7.8	8.4	9.3	9.4
Cultivated weekly to depth of 6 inches.	4.5	5.0	5.4	7.0	7.2	7.8	8.4	9.4	9.8
Cultivated weekly to depth of 8 inches.	4.8	5.0	5.4	6.6	7.2	7.6	8.0	9.3	9.5
Cultivated weekly to depth of 10 inches.	4.3	4.9	5.0	6.0	6.6	7.0	7.3	8.4	8.7

TABLE II. — *Summary of Soil-Moisture Contents in Three-Foot Depths, in Acre-inches per Acre, in the Cultivated and Uncultivated Plots at Davis. Irrigated August 2, 1921.*

Depth of soil samples in feet	Aug. 3	Aug. 5	Aug. 8	Aug. 26	Sept. 23
0-3 Cultivated.	11.09	9.83	9.50	8.56	8.46
Uncultivated.	11.94	10.44	9.88	9.13	8.33
3-6 Cultivated.	8.94	8.38	9.36	8.99	8.52
Uncultivated.	9.59	9.08	8.85	9.03	8.70
6-9 Cultivated.	20.03	18.21	18.86	17.55	16.98
Uncultivated.	21.53	19.52	18.73	18.16	17.12

The writer has in addition carried out a series of observations regarding the irregularity of distribution of moisture in the soil. He gives a graph showing the distribution of moisture following a rainfall of 2.15

TABLE III. — *Summary of the Soil-Moisture Contents in Three-Foot Depths in Acre-Inches per Acre in the Cultivated and Uncultivated Plots at Whittier, 1921. Irrigated July 15, 1921.*

Depth of soil samples in feet	July 21	Aug. 4	Aug. 18	Sept. 3	Sept. 30
0-3 Cultivated	9.59	8.98	8.55	9.09	8.82
Uncultivated	9.98	8.71	8.71	9.09	8.60
3-6 Cultivated	8.49	8.21	8.21	8.38	8.32
Uncultivated	7.93	7.88	7.88	7.99	8.05
0-6 Cultivated	18.08	16.76	16.76	17.47	17.14
Uncultivated	17.91	16.59	16.59	17.08	16.65

TABLE IV. — *Summary of Moisture Contents in Four-Inch Depths of Soil in Percentages, two Months after Irrigation.*

Location of Plots	Treatment	Depth of soil samples in inches				
		0 to 4	4 to 8	8 to 12	12 to 16	16 to 20
Davis	Cultivated	6.6	15.7	20.1	19.1	18.6
	Uncultivated	8.6	15.5	19.0	15.0	19.4
Mountain	Cultivated	4.0	9.5	10.2	10.3	10.7
	Uncultivated	3.9	9.1	10.4	11.0	10.9
Delhi	Cultivated	1.3	3.9	4.1	4.1	4.2
	Uncultivated	1.5	3.1	3.3	3.7	4.1
Whittier.	Cultivated	4.1	11.5	15.1	16.2	15.9
	Uncultivated	4.1	11.0	16.2	17.3	16.5

inches. The percentages of moisture have been determined on plots of 24 inches depth and a line shows the limit between moistened soil and dry soil.

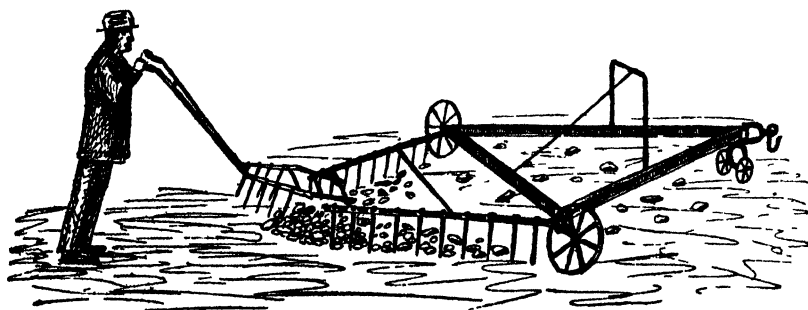
Determinations have also been made on the variation of growth of plants according to the amount of water in the soil. Observations in deciduous orchards show that the soil moisture supply may fluctuate within wide limits without measurably affecting the growth of the tree.

Geffroy Stone Gatherer.

AMBRAULT, Daniel. Ramasse-pierres Geffroy. *Journal d'Agriculture pratique*, Paris, 1927, an. 91 t. 1, n^o 14, p. 274-275.

We give a sketch of this machine, which is made by M. GEFFROY at Faverolles (Eure-et-Loir).

It consists of 2 rakes of different kinds which approach one another at the back, the stones being collected in between.



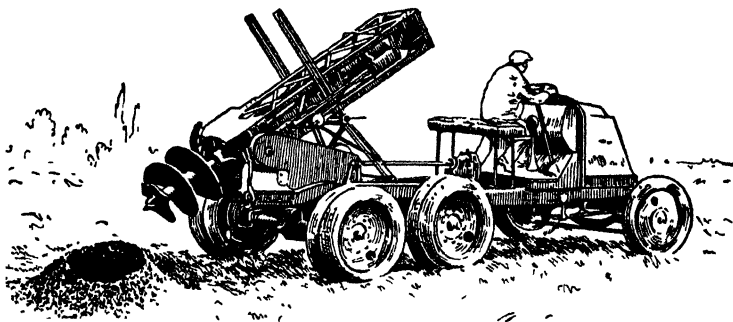
Geffroy Stone Gatherer in working position.

A simple device lets the stones fall in heaps by raising the part behind the rakes by means of handles.

The whole of the raking apparatus is detachable and for transport can be laid on a support placed on the transporting frame.

The Renault Soil Drilling Machine.

The Implement and Machinery Review, London, 1927, vol. 53, No. 626, pp. 190-191.



RENAULT Soil Drill.

This machine, of which an account has already been given in the May number of this Review, drills in ordinary soil 50 holes an hour, with a diameter of 6 cm. and depth of 75 cm.

The Use of Combines or Harvester-Threshers in certain States of the U. S. A.

I. MILLER R. C. *The Combine in North Dakota - Agricultural engineering*. St. Joseph, Michigan, 1927, Vol. 8, No 5, pp. 115-116.

II. MACCUEN G. W. *The Combine in Ohio*. Ibidem pp. 116-117.

III. BLASINGAME R. V. *The Combine in Pennsylvania and Delaware*. Ibidem 117-118.

IV. WLEMAN R. H. *Field Tests of the Combine in Indiana*. Ibidem p. 118.

V. LEHMANN, E. W. and BLAUSER, I P *The Advance of the Combine in Illinois*. *Farm Implement News*, Chicago, vol. 48, No. 26, pp. 12-14.

I. *Combines in North Dakota*. — During 1926 in North Dakota 25 combines harvested and threshed various crops including wheat, oats barley, rice, buckwheat, flax, etc. This was the second season for combines in North Dakota, in 1925 only 3 combines having been used in that State. In territories in which crops were good, it has been noted that the combine supplied good marketable grain and all the owners were very satisfied: uneven ripening of grain however would prevent success. Among the cases in which the combine was very successful an example is given of a field which was cut partly with a binder and did not give a sufficient return, whereas on the rest of the field the combine obtained a yield of six bushels per acre, double that got with the binder which entailed a serious loss of grain.

Among the combines seen in use, were two 9 foot Case, one 12 foot Case, five 16 foot Case and four 10-foot MacCormick Deering. They were all drawn by tractors of 15-20 drawbar h.p. and in one case a 15-30 tractor.

Generally speaking it was felt that some economical drying method would efficiently solve the difficulties presented by this machine. The combine owners appear satisfied. The flax crop particularly is specially suited to their use.

II. *Combines in Ohio*. — In this State the first combines were used last year to harvest wheat and oats. Soy beans were harvested with a combine during the autumn of 1925.

Comparative tests made on both methods show that with the binder-thresher method of harvesting there was a net loss of 178 pounds of wheat per acre, and with the combine method there was a loss of only 102 pounds of wheat per acre.

III. *Combines in Pennsylvania and Delaware*. — It has been noted in Pennsylvania that the harvesting by means of the combine is much more economical than that of employing binder and thresher, and the combine can be employed to advantage by the farmer and its use should become more general.

IV. *Field Tests of Combines in Indiana*. — Comparative trials have been carried out in order to discover the losses and the cost per acre with the two systems of the combine and the binder-thresher. The combine required 2.03 hours of man-labour and 2 hours of horse labour per acre from standing grain to the bin as against 5.08 hours man-labour and 5.59 hours horse-labour needed by the binder-thresher. The loss of grain with the combine was 4.16 % as compared with 6.62 % with the binder thresher, giving a difference of 2.46 % in favour of the combine.

As regards total labour cost the combine cost 7.09 cents. less per bushel, the cost figures being 16 7 cents per bushel with the binder-thresher, against 9 61 cents per bushel for the combine.

V *The Combine in Illinois*. — The first combine was used in Illinois in the autumn of 1924. In 1926 64 were in use.

There are 3 types in use. (1) 9-, 10-, and 12 foot machines with separate motors mounted on them to operate the combine. These are horse or tractor drawn. (2) There are also 9 and 10 foot sizes, where the power is furnished either by a separate motor mounted on the combine or from the tractor pulling it. (3) The third type of combine is mounted on a tractor and driven by it through the belt pulley.

An account is given of the working of the different types under different conditions and of the advantages and possible disadvantage of this new device

Among the advantages experienced are :— the decrease in grain lost, great saving of time, labour and twine, quicker and more efficient harvesting especially of the sweet clover and soya bean crop, the better quality of grain obtained.

The disadvantages would appear more theoretical than practical and the fear of wheat etc. heating when harvested by the combine was not entertained as serious at Chicago in 1925, when wheat after having been refused by local buyers on that account got top price at Chicago.

Since then there have been no further complaints. The only serious disadvantage in the opinion of the writer is the large initial cost \$1100-\$2200, for a machine which would mean duplicating some of the machinery already on the farm

It has been successfully used for wheat, oats, soya beans, sweet clover, red clover, timothy, Alsike, buckwheat, rye, barley etc. In certain cases certain adaptations or adjustments are necessary, and the grain must be dead ripe, but most of the difficulties experienced are met with also under the old system, whereas the advantages of the new are considerable.

The "Zybach" Tractor Guide.

Farm Implement News, Chicago 1927, Vol 48, No 23, pp 15 and 19 and illustration

This device consist of a 4' iron pipe, one end of which is fastened to the front axle of the tractor and the other to a curved piece of sheet iron which runs in the furrow. One furrow is ploughed *round* the field, the guide is set and the outfit goes its way. A connection with the ignition of the tractor stops the combination automatically in case the tractor leaves the furrow or when the unploughed part of the field becomes too short for a turn to be made.

Demonstrations at the University farm at Lincoln and elsewhere have been very successful and on several occasions the tractor has ploughed 6 hours at a stretch without a man having touched either tractor or plough.

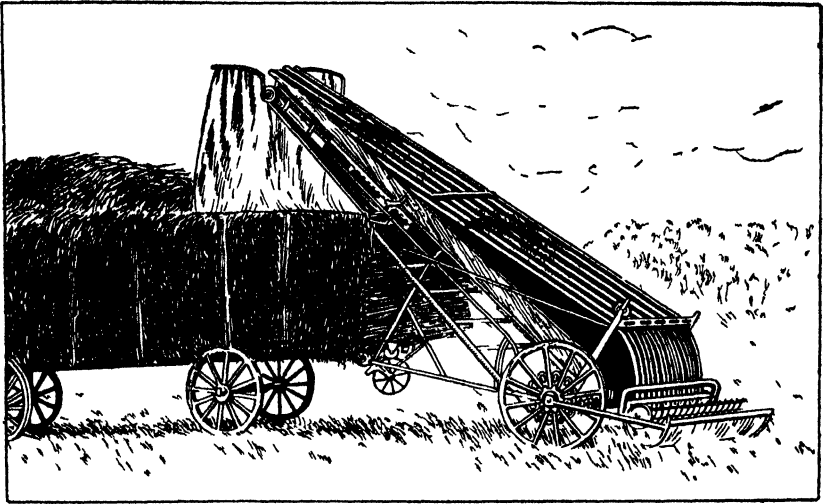
It is hoped to produce it on a commercial scale in the near future.

New Hay Loader.

MEYER Erich. Prüfung einer Heulademaschine mit Nachrechen. *Die Technik in der Landwirtschaft*, Berlin, 1927, 8 Jahrg, Nr 5, p 31-34.

This machine is made by the "Osterrieder Werk" of Memmingen in Bavaria. It includes a circular rake which pushes the hay towards the elevator platform.

The movement of both elevator and rotary rake is supplied by the



Hay loader made by the "Osterrieder Werk"

2 large wheels which support them. The illustration given here shows a general view of the machine, photographed during its trial at the machinery trial Station of Hohenheim (Wurtemberg) where it gave good results.

ANIMAL HUSBANDRY

Variations in the Number of Erythrocytes and Leucocytes in the Horse resulting from Work.

PREVE A. Variazioni degli eritrociti e dei leucociti nel cavallo in conseguenza al lavoro. *Il nuovo Ercolani*, Turin, 1927, a. XXXII, n° 7, p. 97-108, bibliography.

Results of experiments on the horse to determine whether the number of erythrocytes and of leucocytes varied after a given amount of work and to what extent, with the object of establishing if possible, the relation between this number and any estimate that may be formed of the functional capacity of the animal.

The writer experimented on army horses, known to be healthy and well nourished, these animals were fed twice a day at fixed hours on the following daily ration.—oats 4 kg., hay 5 kg., straw 1.5 kg. The samples of blood were taken from different parts sometimes from a peripheral sometimes from a central vein, but always from the same vein before and after work.

The writer used the Thomas ZEISS method for counting the red and white corpuscles.

The various observations made on 5 horses justify the following conclusions :—

(1) After work whether of long or short duration there is always a decrease in the erythrocytes,

(2) In most cases an increase in the number of leucocytes is noticeable,

(3) The above observations always hold good whether the sample is taken from a peripheral vein or a central vein (jugular). This proves that the variations are produced throughout the blood and not only in the peripheral vessels as stated by certain writers;

(4) The decrease in erythrocytes and increase in leucocytes are maintained even after work stops;

(5) About 4 hours after the work is finished, the number of erythrocytes increases considerably so as usually to reach a point just beyond that reached in the horse at rest;

(6) These variations bear no relation to the amount of work done;

(7) In the present state of knowledge on this subject, it is very difficult to find the reasons for these phenomena, but it may be stated that, chiefly owing to the lack of a definite connection, or, better, of a constant

between the intensity of the work and these two elements of the blood, an examination of the haematic formula does not give sufficient information for estimating the resistance of horses to fatigue.

Progress of Animal Husbandry in Spain.

ARÁN S., El progreso de la ganadería *La Industria pecuaria*, Madrid, 1927, a. XXVIII, nº 918, p. 491-492, 1 fig.

Reckoning the number of heads of the different species existing in Spain in 1905 at 100, the following are the figures for 1925: horses 140 — mules 167 — donkeys 162 — cattle 183 — sheep 154 — goats 199 — pigs 302. The average weight of carcasses in the slaughter-house of Madrid, which is supplied from every part of Spain where stockraising is of any considerable importance, rose from 170 kilos in 1915 to 229 kilos in 1926 showing a progressive increase, which, except for slight rises and falls, remains regular, thus testifying to a collective improvement in cattle effectives throughout the country. Not only did the weight of the quarters increase 34 7 % in 10 years, but as a result of the general cattle competitions in 1913 and 1927 the average dead weight rose during this period from 58.13 to 61.08 %

Goats and Sheep of the African Centre.

PÉCAUD (Veterinary Major) *Revue d'Histoire Naturelle appliquée*, v VIII, n. 4, p. 101-112 Paris, 1927

The total flocks (sheep and goats together) of the African Centre may be estimated at about two million head, of which three-fourths are sheep.

The sheep are mainly bred by the nomad or semi-nomad people of the north, while the goats are mainly the property of the settled people of the centre and south. Several breeds of sheep occupy Tchad — two original breeds, one small and one large, and two recently imported, large.

Sheep of small African breed — described by PIERRE as Fonta Djallon breed; these sheep are rare in the Tchad colony, they are covered with hair, of small size, 45-50 cm. at the withers and 18 to 20 kg. in average weight. The coat is fine and lustrous, black and black and white. This breed is very hardy, very prolific, but of poor milking quality, easily fattened and giving meat of good quality.

Sheep of large breed:

(1) Arab sheep: these form the majority of the sheep bred in the colony; large size, 80-90 cm. at the withers and 20-30 kg. in average

weight ; hair thick, coarse and of variable length, not wool. At Tchad there are several varieties of these sheep, differing mainly by the colour of the coat.

These sheep are hardy, good travellers, very sensitive to moisture : the method of sheep rearing by seasonal migration prevents the possibility of fattening and their meat is lean and tough. The species is prolific and of fairly good milking quality.

(2) Two breeds of large sheep introduced into the Colony by nomad Peuls, especially by the Berroros :—

(a) The greater number of these flocks consist of animals of large size (70-100 cm. at the withers), with curved head, with stiff hair, not wavy, coarse and short. The head, the neck, the shoulders and the forelegs are tawny, sometimes black ; the body and hindquarters are white. It is a hardy breed, prolific, suitable for the production of meat : these sheep are very sensitive to moisture and to the tsetse fly.

(b) Some representatives of a breed known by the name "bellani" are also found, which correspond fairly well with the sheep called "touareg" of the South-Sahara zone and the upper part of the Niger basin. They are sheep of large size, with the head strongly curved, white in colour rarely with tawny spots, and short haired.

Breeds of goats. — There are two breeds :— that of the south or "Fonta Djallon" race and that of the north or "Moor" race.

(1) Dwarf African goat or Fonta Djallon breed :— 40-50 cm. at the withers, 15-20 kg. in average weight ; milking quality poor, but very prolific (bears 2, often 3 or 4 kids). Hardy and resistant animals ; when castrated and well fed they fatten rapidly, give meat of good quality and absolutely odourless.

(2) Goat of the Moorish breed or Arab Goat :— a large animal (60-60 cm. and over) ; average weight, 25-30 kg., 40-45 in well fattened animals. Breed less prolific than the previous one, milking quality well developed ; there are two types — one with short fine hair and the other with very long hair forming a mantle over the neck and back. Crosses between these two breeds of goats are frequent ; the large breed is very sensitive to moisture ; the cross-bred animals resist better.

In the Baguirmi district an intermediate type has even been formed, whose characteristics are beginning to have a fair amount of fixity.

The writer then gives an account of the general position of sheep breeding in the Colony and of the method of handling flocks, and concludes that to breed sheep for wool it would be necessary :—

1. to form the flocks exclusively of imported sheep and never to cross these with the indigenous hairy sheep.

2. to introduce these breeding animals by a route free from tsetse fly.

3. to carry out this breeding in a dry district.
4. to place in charge of the enterprise a person of capacity and perseverance.

Possible Connection of Chemical Composition of Pastures with Mortality among Lambs in Central Otago, N. Z.

ASTON B. C., F. N. Z. Inst., *N. Z. Journal of Agriculture*, Wellington, 1927, Vol. XXXIV, No. 4, pp. 231-236. Tabs. 4.

The hitherto unexplained mortality among lambs last season in Central Otago has led to chemical analysis of the ewe's milk, of the herbage and of the soil in those districts where deaths occurred. Lambs that died were in exceptionally forward condition, just beginning to graze. They were attacked when about 3 weeks old and the disease, known as "Pulpy Kidney" owing to the condition of the kidneys after death, lasted about 3 weeks.

Milk Analysis. — No great abnormality has been found, only the milk has been very abundant.

Soil analysis. — (1) Mechanical analyses show no differentiation. (2) The soils from healthy and unhealthy districts differed only in the fact that the soil from the former contained about half the amount of available and also total phosphoric acid of that present in soils from infected farms. All were high in total lime and potash as also in available potash and available phosphoric acid.

Very early and very late lambs did not fall victims, which would point to some seasonal change in the chemical composition of the pasture being possibly responsible.

Again the fact that twin lambs were immune points to the milk not being poisonous but possibly to its being present in excessive amounts unassimilable by the single lamb, a supposition borne out by the milk analysis.

Pasture analysis. — Samples were taken and examined but only in sufficient numbers to show the lines on which future investigations must run.

Compared with Welsh pastures examined at Aberystwyth, the Central Otago pastures are higher in true protein and in the ratio of true proteins to amides. Again, compared with samples of Cambridge (England) grown and tested samples of pasture, the N. Z. pastures were found low in protein but higher in the ratio of true protein to amides.

Physiologists have observed that an excess of protein in the diet of mother rats causes mortality in the young during the lactation period.

Again it is possible that at a certain early stage there may be an abnormal proportion of non proteid nitrogenous constituents such as amides etc. in the pastures, which exert a further strain on the digestive organs of lambs already overtaxed with excessive milk. Evidence at least shows that when mortality was lower in years past there were plenty of rabbits

to graze off the very youngest and tenderest growth, but that now the rabbits are kept in check this growth is consumed by sheep.

Further very careful investigations are needed.

Sheep Hand Feeding Trials in Victoria.

THOMAS, J. E. *The Journal of the Dept. of Agriculture of Victoria, Melbourne*, 1927, Vol. XXV, Part 3, pp. 133-144.

When, as may often happen in Victoria, the grass gives out, sheep-owners must either sacrifice their sheep in the glutted sale yard or hand-feed, the possibility of economical agistment under the circumstances being meagre.

Experiments were carried out at the State Research Farm on 60 wethers, rising 4-tooth, Riverina bred, which were divided into 3 lots and fed as follows:—

Dates	Food	Initial av. wt.	Wt at end of each period	Gain or loss per period
Lot I				
21 April — 29 June . .	Algerian Straw . . .	88.4 lbs	81.4 lbs.	— 7.0 lbs.
30 June — 19 August .	A. S. + 4 oz Linseed		90.4 "	+ 9.0 "
20 August — 2 October	A. S. + 3 oz. "		94.0 "	+ 3.6 "
3 October — 14 October	A. S. + 2 oz. "		91.6 "	— 2.4 "
Lot II				
21 April — 30 July .	Algerian Straw . . + 0.5 lbs. Lucerne Hay (17-30 July for 0.5 read 0.75 lbs)	87.8	89.3 lbs.	+ 1.5 lbs.
31 July — 14 October .	Mixed Oat and Wheat Chaff 1 5 lbs. (1st fortnight 1.8 lbs)		94.9 "	+ 5.6 "
Lot III				
21 April — 2 July. . .	Algerian Straw + 6 oz. oats	83.1	81.5 lbs.	— 1.6 lbs.
3 July — 11 August . .	A. S. + 8 oz. Oats		81.1 "	— 0.4 "
12 August — 14 October	Oat Silage approx. 3 lbs.		87.2 "	+ 6.1 "

There was no noticeable difference in the health of the various lots throughout. After the trial they were run on good pastures for 4 weeks and then shorn, an average cut of 10 lbs. per fleece being obtained.

The straw was of excellent quality but was insufficient when fed alone. 8 oz oats appears just insufficient and probably 9 oz + straw would be ample. A silage maintenance ration would probably be about 2 1/2 lbs.

The trials were made in winter, the lowest temperature experienced being approximately 32°F. and the highest 84°F. Higher and lower temperatures would necessitate less or more rations respectively.

Whether it is more economical to chaff hay before feeding or not depends entirely on local prices of labour, hay, etc.

The best method of feeding chaff to sheep is undoubtedly by means of a self-feeder of some sort of other, the essential being that it should be big enough to reduce to a minimum the labour of filling, that there is enough roof protection to keep the rain off, and that it is sheltered from the wind. An illustration of such a feeder is given.

The following hand feeding principles are given :—

Duration of process. — Start in good time and do not finish till the grass has got a good start.

Watering. — There must be plenty of not too saline water available, i. e., not more than 400 parts of salts per 100,000.

Salt. — Salt must be supplied. The amount consumed in the trials was approx. 1.33 oz. per head per week. For wet sheep requirements are greater.

Food. — Mixed foods give better results than single foods. Unpalatable foods such as straw will be readily eaten if a little molasses is added.

Flocks. — Flocks should be small and adequate trough accommodation provided, otherwise the weaker sheep will suffer.

AGRICULTURAL INDUSTRIES

Use of Skim-Milk for Bread Making.

DORNER W. (Agric. Engin. attached to the Federal Establishment of Dairy Industry and Bacteriology, Liebefeld-Berne). *L'Industrie Laitière Suisse*, Brougg, 1927. y. 3, n. 23, p. 104-105.

After calling attention to the high food value of bread made with skim-milk, owing to its content in vitamin B and in protein, which is of great value from a biological point of view, the writer reports a series of results obtained in bread-making experiments with skim-milk.

A) Personal experiments made at the bakery of the Workmen's Union at Berne, have established that 100 litres of separated milk result in an extra yield of 16.6 kg. of bread ; it was also observed that bread made with skim-milk lost less weight during baking than ordinary bread, whilst 20 gm. less of dough with skim-milk than of dough with water was required to make 1 kg. of bread.

The experiments have also shown that, to get doughs of the same consistency, 8 litres more of skim-milk than of water has to be added per 100 kg. of flour.

B) Joint experiments carried out by the Dairy Federation of Léman and by the Consumers' Co-operative Bakery at Vevey : 100 kg. of flour + 70 litres of separated milk + 10 litres of water gave 143 kg. of baked bread, while flour and water only gave 132 kg. of baked bread ; this represents an increase of 11 kg. of bread due to the skim-milk. On analysis the bread with skim-milk gave 44.5 % of moisture in the crumb and the bread with water 45 %.

C) Experiments made by the Dairies which form annexes to the great Economic Bakery of La Pallanterie (Geneva) : 100 kg of flour + 62.2 litres of water = 138 kg. of bread ; 100 kg. of flour + 70.4 litres of skim-milk = 148 kg. of bread, giving for 100 litres of skim-milk an increase of 14.2 kg. of bread.

To sum up, it may be said that, besides an undeniable improvement in the quality of the bread, the addition of 100 litres of skim-milk results in an increased yield of bread of about 14.5 kg.

The principal drawback to the use of skim-milk in bakeries is its tendency to coagulate during heating or even before ; it goes sour more readily than ordinary milk. This drawback is obviated : 1. by pasteurising the skim-milk ; 2. by neutralising the lactic acid of bacterial formation by

means of carbonate of ammonia, the use of which is permitted in bakeries and which is volatilised during baking, 1.6 gm. of commercial carbonate of ammonia being enough to reduce by 10^0 (Soxhlet-Henkel) the acidity of one litre of milk.

This new use of skim-milk in bread-making will make possible a more remunerative employment of this product, and also avoid a glut in the pig market, as up to the present pig fattening constitutes the principal lucrative use of skim-milk.

The α - and β - Glutelins of Wheat (*Triticum vulgare*).

CSONKA, F. A. and BREESE JONES, D. *The Journal of Biological Chemistry*, Baltimore Md., Vol. LXXIII, No. 1, pp. 321-329, bibliography.

An account of the preparation of α and β glutelins from wheat flour.

It was found possible to precipitate them from a 0.2 % NaOH solution by adding small amounts of $(\text{NH}_4)_2\text{SO}_4$, the α glutelin separating as a flocculent precipitate on making the alkaline solution 0.018-0.02 saturated with $(\text{NH}_4)_2\text{SO}_4$, the β not precipitating completely till the solution was about 0.18 saturated.

The α contains 17.14 % nitrogen, the β 16.06 %. Both have the same isoelectric point, namely pH 6.45.

Remarks on Oil of Grape Stones.

MARGAILLAN L. *Comptes rendus de l'Académie des Sciences*, v. 185, n° 4, p. 306-307. Paris, 1927.

Different writers have attributed very various properties to oil of grape stones. The writer, after several years' work, has ascertained that if this oil is extracted with care from fresh stones it presents constant characteristics and does not at all resemble castor oil, as has been affirmed; it is not soluble in alcohol, its viscosity is in no way remarkable and its acetyl index is very low (from 4 for a carefully prepared oil to less than 50 for oils prepared without special care, or made from stones which have been for a long time exposed to weather or were not treated by the solvent till a long time after crushing). There is no relation between increase of the acetyl index and that of the acidity index, which may remain very low.

As is the case with most oils and in contradistinction to castor oil, the acetyl index of oil of grape stones is essentially a variable.

Oil of grape stones is easily *inflated*, although less easily than colza oil. For industrial oils inflated at 125^0 the writer has obtained after 4-7-10-12 hours of treatment respectively the acetyl indices 31-37-44-57; the initial value was 23; after 12 hours of treatment the oil is congealed into jelly.

Inflated oil of grape stones forms a good lubricant.

The Advantage of the Preparation of Aseptic Wines of moderate Alcohol Content preserved by Refrigeration.

MONTI E. Convenienza della preparazione di vini asettici di moderata alcoolicità conservati col freddo artificiale. *L'Industria Italiana del freddo*, Milan, 1927, a. II, n° 6, p. 4-5.

The writer refers to the experimental results obtained by Drs. VERNON and SCHARFENBERGER, Profs. BERTARELLI and BERTHELOT and himself, showing that alcohol has a toxic action on the organism (lessening of generative efficiency, increased mortality of the new-born), which increases in strength with increased concentration, and he suggests the preparation of non poisonous wines of lower alcohol content, rich in tannin and in dry content, which slow down the absorption of the alcohol and diminish its effects, and the use of refrigeration for preserving it, especially in Italy where there is a shortage of deep and well ventilated cellars. The saving of millions of pounds would result and great quantities of wine would be saved from the vinegar makers, while the labourer who is a large consumer would have a more wholesome and suitable wine to drink.

The Determination of Casein in Milk by an approximately iso-electric Precipitation.

WATERMAN, H C. *Journal of the Association of Official Agricultural Chemists* Washington, D C, 1927 Vol X, No 2, pp. 259-263.

The author states that his new proposed method is shorter and more convenient than the official method, and that the results were more consistent than those obtained in parallel trials where the official method was used. The method is as follows :—

Pipet 250 cc. normal acetic acid into a 1000 cc. flask. Add 125 cc. normal CO₂-free NaOH. Make up to 1000 cc. with CO₂-free distilled water and mix thoroughly.

Pipet 20 cc. of sample into a 100 cc. flask. Add 50 cc. of above reagent, mix, complete volume with distilled water and shake well. Put flask in hot water (50°-60°C, not over 60°C.) and let stand 15 minutes. Cool to room temperature and filter. Use a double folded paper returning filtrate once on twice to the filter. Filter once through a hardened paper.

Determine nitrogen (A) in 50 cc. of the clear filtrate and total nitrogen (B) in 10 cc. of the milk. $6.38 \times (B-A) = \text{casein in 10 cc. of milk.}$

Report grams of casein per 100 cc. milk or divide the grams per 100 cc. by the density of the milk and report as percentage by weight.

Precipitation is thus made at very nearly the iso-electric point of casein and another tedious operation in the official method, viz. the quantitative washing of casein precipitates, is avoided.

Modification of the Waterglass Method of Preserving Eggs.

PODHRADSKY J., Pokusy o konservování vajec vodním sklem a o nové modifikaci této metody. *Věstník Československé Akademie Zemědělské*, Prague, 1927, v. III, n° 3, p. 266-268 (German Translation pp. 269-271).

In the experiments here described, which were carried out in the Biological Section of the Moravian Zootechnical Experiment Station of Brünn, the writer has shown clearly that waterglass, which is a silicate of sodium or potassium, reacts with the constituents of the egg-shell, chiefly with the carbonate of calcium to form silicates of calcium, which block up the pores and considerably restrict the circulation of air within the egg. Hence the question arises whether the present method of preserving eggs in waterglass may not be modified by leaving the eggs in the solution instead of up to the moment of sale, for a brief period only of 7, 14 or 21 days and following this by draining, drying and preserving them in cases in a cool place.

Experiments checked by minute analyses proved that up to 98 % of fresh eggs so treated kept well, preserving unchanged their colour, fragrance, taste and consistency. The experimental period of preservation was for 60 days.

This modification of the method permits a saving in space and in material, since one and the same solution of waterglass can be used to treat several lots in succession.

SYLVICULTURE

Scientific Organization of Labour in Forestry Industries. Considerations on the Timber Industry in Yugoslavia.

PODBREZNIK FRAN. D. (Engineer). L'organisation scientifique du travail dans les exploitations forestières. Considérations sur l'industrie du bois en Yougoslavie. Report presented to the " *IIIrd International Congress of Scientific Management, Rome Sept. 1927* " *Proceedings* P. II, *Memours*, Vol. II and III, Sect. f. p., 543. Rome, 1927 (1).

The writer says that the object of this report is to draw the attention of interested persons to the need for co-ordination of efforts to create a scientific organization applicable to the forestry industry.

The organization of labour in the forestry industry is not yet much developed and progress is very slow. The causes of this are as follows:—

1) The special nature of this industry, involving many various kinds of labour ;

2) The relatively large number of trade outlets available since the war ;

3) The abundance of the raw material, i. e. of timber, especially in a country like Yugoslavia ;

4) The special nature of timber, with its numerous varieties and adaptations.

Yugoslavia, like the greater part of the countries of Central Europe, is in danger of seeing its production of timber diminish from year to year. The application of a scientific organization will become a necessity if the timber industry is to be preserved, as Russian competition, already imminent, must also be taken into account.

In these circumstances measures should be taken both by the International Congress and by the National Committees to popularize the idea in forestry circles and to coordinate the efforts of experimentalists to create methods of scientific organization applicable to this industry. The weak

(1) Cf. also the Proceedings of the 3rd International Congress of Scientific Management, Rome Sept. 1927, P. II, Vol. II and III, Sect. e, p. 397 GIEDRZYCKI Eng. E., " Harmonographical Control in Farming ", p. 442.

FAUGERAS-SCHIFF Eng. I., " L'organ. scient. du travail dans les entreprises de Labourage électrique ", p. 494.

SEEDORF Dr. W. " Die internationalen Aufgaben der Landarbeitswissenschaft ".

FONTANA, Dr. A. " L'organisation scientifique du travail agricole ".

point of the international timber industry is that in spite of the efforts of individuals it has not yet been possible to arrive at an international agreement or at the creation of a "Cartel".

Scientific organization in the forestry industry should be mainly directed against waste of timber and it is of secondary importance to seek to reduce the manual labour.

How can an organization of the forestry industry be effected? This industry first of all requires delimitation of the fellings and their estimation in timber and money value. But the work of making such estimates is complicated, and has to be performed in the shortest possible time and with scientific accuracy.

Methods of cubing trees differ from one region to another and uniformity in this respect must be our aim (1).

Mechanical felling of trees is still uncommon in Yugoslavia; this may be effected by means of linear and circular saws, helicoidal augers and also with chains or wire made red hot, the various labour conditions of these devices need investigation. The necessity of utilizing in the forests the residues from the fellings must not be neglected, the best method being carbonization in mobile apparatus. It is also possible to obtain wood tar from these residues, which may be mixed with charcoal or formed into balls with sawdust.

The transport of timber in logs is one of the most troublesome problems of the forestry industry, but even here the application of the Taylor system is possible. Loading platforms should be constructed near the roads, the floors being at a height level with the floor of the vehicle.

At present efforts are being made to increase the number of motor tractors. Caterpillar tractors, which are so largely in use in the United States, are also frequently employed.

As regards installation and arrangement of saw-mills it is necessary: 1) to arrange the business as to reduce the cost of Labour and the production costs to a minimum; 2) to select as a site for the saw-mill a place to which material can easily be brought and at the lowest cost; 3) to have at one's disposal motive power, material and machinery the production of which is well co-ordinated; 4) to assign to each workman the work which is best suited to his natural aptitude and to his professional knowledge, 5) to "standardize" and "Taylorize" the various manufactures as far as possible and conformably to the temperament of the workman.

The above remarks relate to the individual organization of the forestry industry

Collective organization and its application in this industry need not be considered, since individual organization is here always preferable. Collective rationalization can here only be introduced in the form of depots for collective purchase and sale and of experimental stations but cannot

(1) This important question has already been considered by the International Institute of Agriculture which placed it on the Programme of the autumn meeting of the International Scientific Council, technical-scientific Committee for Forestry. (Ed.)

be applied to production. It is the business of the State alone to supervise forest preservation and regular exploitation.

A new Western Birch.

SUDWORTH G. B., *American Forests and Forest Life*, Washington, 1927, vol. 33, no. 401, p. 286.

Major John D. GUTHRIE discovered in 1924 in the north east of Oregon by the side of the river Jmnaaha at a height of 2500-4500 feet about sea level a birch with a reddish bark, which at first he thought to be *Betula fontinalis*, but which more searching examination showed to be a distinct species from this and from its varieties.

The writer proposes that this species should be named *Betula Guthriei* in honour of its discoverer.

The difference between this and the above mentioned species lies in the larger size of its leaves and in the dark coppery brown colouring of the bark of the branches, while the bark on the trunk is of a greyish coppery brown colour with numerous corky lenticels set horizontally.

As far as present knowledge goes this birch reaches a height of 25-40 feet and the diameter of the trunk is of 10-18 inches.

Forestry in Tripolitania.

PAVARI A. *L'Agricoltura Coloniale*, Florence, 1927, a. XXI, n. 4, p. 121.

(1) *The fixation and re-afforestation of moving dunes* — The writer records and illustrates the important work for the consolidation and re-afforestation of the moving sand dunes in Tripolitania, directed by the "R. Ufficio per i servizi agrari della Tripolitania" (1).

The woody plant which has proved to be best adapted for the above-mentioned purpose is *Acacia saligna* Benth., which has also given excellent results in the Mogador dunes.

One year old plants raised in pots are used and consequently they are planted out with their roots enclosed in nursery earth. After one year from planting they are already over 1 m. high and after two years they attain surprising proportions. From 150 to 200 plants per hectare are sufficient to constitute the basis of re-afforestation and with their powerful roots they fix the surface of the dune in a tenacious and inextricable covering.

Robinia pseudo-acacia has also proved valuable in the dunes of Tripolitania. It is planted with bare roots in a simple hole in the sand. It serves very well as filling between the other acacias.

Tamarix articulata, the Ethel of the Sahara, has proved excellent all over the North of Africa for consolidation of the sand and grows well in dunes of coarse sand and exposed to salt winds, where the Australian acacias suffer considerably. The rooting and growth of forest vegetation

(1) Cf. *International Review of Agriculture*, n. 1, p. 76. Rome, 1927.

are better when the sand is fine and so loses very little water by capillarity.

In the spaces between the dunes, where the sand is not moveable and forms a more or less thick compact crust, it appears that sowings of stone pine and Aleppo pine succeed well.

The stand formed with the above-mentioned species on the Tripolitan dunes and maintained as a thicket can supply an abundance of firewood.

The *Acacia saligna* in Cyprus is cut on a rotation of six years, with a net yield of about £4 sterling per hectare. To maintain the protective effect of the forest in its struggle against the desert the felling should not be clean felling but thinning, that is to say removal of the largest trees.

Both *A saligna* and *Tamarix articulata* also give a considerable production of tanning bark.

The cost of the above-mentioned work at present is about 1500 It. liras per hectare.

(2) *Eucalyptus plantations*. — After a rapid and searching selection of some dozens of species it was concluded that *Eucalyptus rostrata* and *E. resinifera* were best of all. The latter should be preferred for rapidity and intensity of growth and for the quality of its wood which is hard and not liable to split. Hitherto Eucalyptus trees have been planted as windbreaks and along the roads; it is doubtful whether the planting of forests of Eucalyptus is suitable, because it may happen that owing to their great need of water they lower the underground water-table to the injury of adjacent crops. From the financial point of view even with only 500-600 trees per hectare there would be a considerable profit, since at the end of 12 years there might be a timber production of 100 to 120 cubic metres.

In any case planting should be with bare roots, of plants raised in nurseries in the open ground, and for the growth of the plants watering should be done in the first year after planting; thus the plants will make an exuberant growth which will not suffer subsequent arrest.

(3) *The re-afforestation of the Garian*. — Primarily there should be rigorous protection of the pastures with successive zones to enable vegetation to instal itself gradually in its various phases and associations, and slowly improve the conditions of the soil. A scrubby growth can thus be obtained, which forms the first step towards forest reconstruction. Where a little soil exists attempts can be made to plant carobs, Cypress, *Callitris quadrivalvis*, *Pistacia atlantica* and *Acacia saligna*.

Direct sowing of Aleppo pine and Spanish Broom on scarcely shifting soil may also be attempted.

Progress Report on Forest Administration in the Punjab for the Year 1924-25.

MAYES, W. (Chief Conservator of Forests). Lahore, 1925, pp. 1678.

Out of a total area of 18,818 acres of Deodar (*Cedrus deodarus*) forests prescribed for regeneration within a period of 25 years, only 1,953 acres

have been completely regenerated within a period of 6 years. This deficiency is largely due to the disastrous fires of 1921, while the fact that good seed years only recur every 4 or 5 years must also be taken into consideration.

In Rawalpindi East and West 2,292 acres of Chir Pine (*P. longifolia*) have been completely regenerated in a period of 10 years, a fairly satisfactory achievement considering that good seed years of this species only recur at intervals of 3-5 years.

No progress is reported from the fir forests, where felling operations have practically stopped owing to the small demand for fir timber.

In the Shahdara Reserve regeneration of mulberry and "Shisham" from coppice is satisfactory, while in the Jhok Reserve regeneration of the latter by trenching the ground to induce the formation of root-suckers has been successful. Regeneration by coppice and root-suckers of *Populus euphratica* is also progressing well.

Progress with the planting up of the new irrigated plantations has been most satisfactory. The discovery of the method of successfully stocking saline soils with root and shoot cuttings of Shisham (*Dalbergia Sissoo*) marks a great step forwards in the successful planting of these areas which had previously proved very difficult.

Natural regeneration of Chir Pine was excellent in Rawalpindi, but very bad in Kangra. In Kulu and Seraj regeneration of Deodars was very poor.

Sowings of Chir Pine seed in Rawalpindi East and Kandra were generally successful but less so in Rawalpindi West. In Kulu the conversion of an area of 138 acres of oak forest into deodar forest is being successfully accomplished. Regarding regenerations not actually under any working plan, reports show that considerable areas have been planted up with deodar, Chir pine, bamboo and other species, amounting in all to about 400 acres. The reproduction of Robinia from coppice root-suckers was satisfactory.

A successful experiment was made of planting kikuyu grass (*Pennisetum clandestinum*) under the shade of Shisham trees. This grass is a most useful fodder and the experiment may prove very fruitful.

Further experiments with Lac cultivation were made. It is worth noting that the Lac producing insect (*Tachardia lacca*) has been propagated on the shisham.

Populus euphratica and *Pinus excelsa* (Blue Pine) have both proved eminently suitable for making match splints and boxes. Unfortunately the former grows only on a very limited area, while the latter is too much in request for timber to allow of its economic use for matches.

The experiments of the Jallo Resin Factory have so improved the processes of distillation that a grade of resin has been produced to compete successfully with American resin on the London market.

The writer regrets the lack of progress, due to financial reasons, in reafforesting eroded areas.

The year's working shows a net surplus of Rs. 11,12,968 as against Rs. 14,64,504 in the previous year. The decrease is partly due to the fact that last year sales were made of large unsold balances of timber of

the year 1922-23, partly to restricted extraction of timber from hill divisions for want of labour, and partly to the smaller demand for fuel by the military Departments.

Forestry in Kenya in 1925.

GARDNER, H. M. (Conservator of Forests). *Kenya Colony and Protectorate Forest Department, Annual Report 1925*. Nairobi, 1926, pp. 16-22.

The total tree bearing area in the Forest Reserves is comparatively small, and in addition to the regeneration of the present timber producing forest, as it is cut out, not less than 700,000 acres need replanting to make the area adequate.

The present rate of planting will have to be greatly accelerated and this can only be done by the provision of more staff and more money. The amount of timber cut in the past has been comparatively small, during recent years regeneration has kept pace with exploitation, and the forest capital of the colony has been at least just maintained.

The year under report was most unfavourable climatically and the Department's planting programme, the largest to date, was necessarily greatly curtailed.

In every district except perhaps Londiani there was a serious shortage of rain, the results of which following an almost similar drought in the previous year were very serious. Many areas will have to be replanted again in 1926.

The total area of new plantations made was 2,177 acres as compared with 2,127 acres in the previous year. In addition 2,129 were treated for natural regeneration. The area planted included 400 acres of mangroves planted at the coast in the Mombasa and Lamu Districts.

Of the trees planted 68 % were indigenous species and 32 % exotics. Of the former about 700 acres were planted with Pencil Cedar (*Juniperus procera*). The other principal indigenous varieties planted were :— Mangroves, *Podocarpus* (*P. milanjanus* Rendle and *P. gracilior* Pilger), *Mineria* (*Pygeum africanum*), *Mukeo* (*Dombeya Masersii* Hook.) and *Muhugu* (*Brachylaena Hutchinsii* Hutch.)

The bulk of the exotics comprised *Eucalyptus globulus* or *E. saligna* for fuel, but in addition small areas of *E. microcorys*, *E. maculata*, *Acacia melanoxylon* and *Cupressus macrocarpa* were planted for timber.

During the year a 17 year-old tree of *Cupressus macrocarpa* was sawn and produced some excellent boards up to 15" wide. As no pines have proved a success in this country it seems possible that this species will provide the essential fast-growing soft wood. As it appears to mature sufficiently in 30 years, it should prove a most useful auxiliary to the indigenous species which are unlikely to mature in less than 100 years.

In consequence of estimates of quantity required and assurances given by the Railway Administration as to continued use of wood for fuel under certain conditions, the Forest Department will for some years to come have

to concentrate on planting for fuel in the vicinity of the railway and on timber planting in the more remote districts.

The main difficulty in increasing the rate of planting is likely to be lack of labour. Experiments are therefore being made in the reafforestation, without cultivation, of areas cleared of timber. So far the resulting stocking is not so good as on a cultivated area nor is the growth likely to be so rapid, but the cost is small and the result will probably be good enough. A further repetition of the process of direct sowing proved as on previous occasions a complete failure. The shortness of the rainy season makes any such attempts with the slow-growing indigenous species extremely precarious.

More work in encouraging natural regeneration was done than in any previous year. Most types of Cedar are not suited to this form of regeneration, but experience shows that in the ordinary mixed *Podocarpus-Musharage* (*Olea Hochsterretri*) forest large numbers of seedlings and saplings exist, which are, however, ordinarily destroyed by bush and creepers before emerging from the sapling stage. Attempts to save these already existing seedlings have given eminently satisfactory results.

In the Nyeri Division the work done aimed at actually obtaining natural regeneration by preparing the ground to assist germination. Though results have been good in the Muhugu forests, those in the cedar forests do not seem to justify the practice.

The number of young trees raised was 4,073,415 as compared with 2,890,404 in the previous year. Unfortunately owing to the drought curtailing the planting season, the exceptionally large number of 439 000 had to be thrown away.

At the end of the year 34 nurseries were being maintained by the Department.

The quantity of tree seeds collected at all stations during the year amounted to 5 tons 8 cwts. ; of this quantity 2 tons 5 cwts. was Cedar seed and 1 ton 3 cwts. *Podocarpus*, the remainder chiefly consisting of Olive, Muhugu, Musharage, Mueri, Greenheart, Mugaita, Mukeo and various exotics.

Formation and Regeneration of Forest in the Central Provinces of India.

WIRT, S. O. (Chief Conservator of Forests). *Report on the Forest Administration of the Central Provinces for the year 1925-26*, Nagpur, 1927, p. 16.

General Progress of areas under regeneration. — Progress in regeneration, which is taking place in Periodic Block I of Raipur, certain babul bans of Berar and a few smaller areas, is generally satisfactory.

The year's experience confirms that of last year as regards the necessity for establishing "Sal" (*Shorea robusta* Gaertn.) regeneration under cover before making regeneration fellings.

Artificial regeneration under the method of agri-sylviculture has been completed over an area of 5,519 acres in the Amraoti, Buldana and Akola

Divisions. The area where regeneration was still in progress at the end of the year was 4,884 acres.

Plantations and other forms of regeneration not under working plans. — In the Northern circle the necessity for the use of weathered teak seed is still apparently not realized. Successful sowing of babul (*Acacia arabica*), nim (*Azadirachta indica*), khair (*Acacia catechu*), etc. in Yeotmal (170 acres), of sewan (*Gmelina arborea*) (17 acres) in Amraoti deserves mention.

The writer stresses the advisability in the Northern and Southern Circles of seriously trying to raise teak in conjunction with field crops.

As regards teak, regeneration by coppice remained very successful throughout. Teak seedling regeneration varied considerably with local conditions. In Berar generally it was fair only, and in parts of the southern Circle it was reported to be suffering from dense grass growth.

It is noteworthy that in South Chauda fire protection is deprecated and in Nagpur-Wardha advocated. The observations of Divisional Forest Officers increasingly tend to show the necessity for close study of local conditions in every case. Variation in rainfall appears the main factor. Different methods have different effects in different places and controversy based on generalisations is barren of useful result.

Bija (*Pterocarpus marsupium*) is reported to have seeded prolifically in several divisions.

The beneficial effects of thinnings are becoming increasingly evident, the necessity for a definite programme of thinning for the period of the rotation being emphasized during the year. The conduct of the work has been systematized as far as possible for divisions where the working plan has still many years to run.

PLANT PROTECTION

DISCOVERIES AND CURRENT EVENTS IN WORLD PHYTOPATHOLOGY

Algeria : *Polychrosis botrana* in the Mitidja Plain (1).

Vineyards of the Mitidja plain (Department of Algiers) have this year experienced a violent attack of *Polychrosis botrana* which has caused serious loss

The warning Stations, set up by government arrangement, notified viticulturists of the appearance of large swarms of moths (April 6-June 11-August 6) and subsequently as to the proper date for control measures. The Station of the Maison-Carrée Agricultural Institute prepared 45 traps containing fermenting molasses thereby capturing

104 moths of the 1st generation.				
608	»	»	2nd	»
4632	»	»	»	»

The damage done by *Polychrosis* has stimulated research and a large number of investigators are trying to find insecticidal products of greater efficacy than arsenical salts or nicotine, or whose application is easier. Some of these products although hitherto not entirely satisfactory present considerable interest. An apparatus for the capture of the moths has also been tried recently with fair success.

Belgian Congo : Diseases and Pests new to the Colony (2).

Algae *Cephaleuros parasiticus* Karst. (syn. *C. virescens* Kunze) on *Lophura* (native species) at Ikaturaka (Equatorial Province). New host-plant and new locality.

The presence of this parasite on the under surface of the leaves of this *Lophura* gives rise to very characteristic orange spots.

This alga has already been found on twenty or so cultivated plants introduced into Belgian Congo as well as on a native *Trichoscypha*.

(1) Communication from the official correspondent to the Institute, M. M. DELASSUS, Plant Protection Inspector of the Government General of Algeria at Algiers.

(2) Communication from the official correspondent to the Institute, M. J. GHESQUIÈRE, Entomologist at Stanleyville.

Fungi: *Erisyphe Polygoni* D. C., on *Indigofera* sp. at Lusambo (Sankuru).

Sphaerella Coffeae (Noack) Sacc., on *Coffea myrtifolia* at Stanleyville.
Venturia sp. uncertain, on *Elaeis guineensis* at Le Kasai.

Didymosphaeria sp. uncertain, on *Panicum maximum* at Lusambo (Sankuru).

Leptosphaeria sp. uncertain, on *Cynodon Dactylon* at Le Sankuru.

Uredo Gossypii Lag., on *Gossypium barbadense* subspontaneous at Bumba and Stanleyville (Eastern Province). It has not yet been noticed on cultivated cotton plants.

Phyllosticta sp. uncertain, on *Voandzea subterranea* at Le Sankuru.

Cercospora sp. uncertain, on *Bidens pilosa* at Lodja (Sankuru).

Cladosporium fulvum Cook, on *Solanum Lycopersicum* at Le Sankuru.

Brachysporium sp. uncertain, on *Calamus* sp. in the Lonkala Forest (Sankuru).

Insects: *Tragocephala glaucosignata* Aur. This new species has been found on cacao trees at N'Gazi (Eastern Province). The larva lives in the stems of the cacao and of *Sterculia tragacantha* (native species).

Alcides depressipennis Hust. The larva of this weevil lives in the nodes of the branches and stems of the coffee tree. Its presence gives rise to more or less globular cecidia and produces arrested growth of the internodes of those plants which are badly affected. The weevil itself gnaws the berries and the young shoots.

Italy: Phytopathological Notes (1).

Numerous serious attacks of *Galerucella luteola* on elms were notified in September 1927, both in Northern and Central Italy.

Notices received from the "R. Osservatorio di Fitopatologia", Turin show that many places in Piedmont have suffered from severe attacks of *Puccinia Pruni-spinosae* on peaches, and of *Gymnosporangium tremelloides* on apples.

Serious damage has also been caused in Piedmont by the attacks of *Clasterosporium carpophilum*.

The control of *Tingis pyri* by means of an extract of quassia wood, which is now specially prepared by a chemical factory, has given excellent results.

Holland: Blue Coloration in Potato Tubers (2).

By this is meant the production of large or small blueish-grey spots on the tubers.

These spots are generally superficial, appearing just below the epidermis, though in serious cases the whole tuber may be affected; it then shows

(1) Communication from the "R. Stazione di Patologia vegetale" of Rome, official correspondent to the Institute.

(2) Communication from the State Phytopathological Service at Wageningen, official correspondent to the Institute

a greyish flesh. The character of this affection is always more intense near the tuber's point of connection.

The blue formation is not due to a parasite, but is caused by pressure on the cells. The amount of the plant's available potash has considerable influence on its occurrence. Tubers from a soil poor in potash are much less resistant to jolts and pressure than those from a soil rich in that element and often show blue spots after digging and transport. Moreover soft potatoes are more easily affected than hard.

The blue spots can only appear in the presence of oxygen. If, after shaking, the tubers are removed from the reach of oxygen, e. g. by coating them with a layer of paraffin, the blue spots do not form. On the other hand they form directly the oxygen can act

The use of so affected tubers as " seed " has no effect at all on the incidence of this phenomenon in the crop, which proves that the affection is not transmitted by the " seed "

The following precautions should be taken to prevent this disease :

- (a) sufficient potassic manuring ;
- (b) the avoidance of unnecessary jolting of tubers, especially if they are already soft in spring ,
- (c) the avoidance as far as possible of the sprouting of potatoes during their storage in winter

VARIOUS QUESTIONS RELATING TO PLANT PROTECTION IN THE DIFFERENT COUNTRIES

French Equatorial Africa : Cotton Pests and Diseases noted recently in the Chari Basin (1).

There is no existing study, to our knowledge, of the different cotton parasites in the basin of the Chari. Those mentioned below are not new, but are in our opinion worth noting. Some of them have quickly become of considerable importance since the attempted large scale production of cotton. Their presence may be a danger to the neighbouring Colonies of Nigeria and Belgian Congo.

(1) Communication from the official correspondent to the Institute, M. NÈME, Ingénieur d'Agronomie coloniale, Assistant Engineer of agricultural operations at Bangui (Oubangui-Chari).

I. LEPIDOPTERA. — *Sylepta derogata*, Fab. (Fam. *Pyralidae*) is one of the two worst parasites in these districts; it only attacks crops of American cotton ("Triumph", "Big Boll"). Some plantations were nearly destroyed in a few days. Its development is favoured by shade.

Control methods used. — Destruction of all the trees on the plantations, collection of leaves by children. The regular use of this method has given excellent results.

A parallel measure: selection of a resistant native cotton plant.

HEMIPTERA. — (1) *Nezara viridula*, L. (Fam. *Pentatomidae*).

(2) *Anoplocnemis curvipes*, Fab. (Fam. *Coreidae*).

These two Hemiptera are not numerous, and the damage done by them is practically insignificant.

(3) *Oxycarenus hyalinipennis*, Costa (Fam. *Lygaeidae*).

(4) *Dysdercus supersticiosus*, Fab. (Fam. *Pyrrhocoridae*).

These two Hemiptera which do very similar damage, piercing the young shoots, the bolls — thus producing premature opening — and the seed — producing a remarkable decrease in percentage of germination — have proved to be, with *Sylepta derogata*, the worst pests of our crops. In many places the loss may amount to 50 %. The loss in value is even greater, the quality of the product deteriorating by reason of spotting and the large proportion of short fibres, due to these attacks.

It should be noted that never more than one of the above species is found in abundance in the same district. The dividing line runs somewhere about 7° N.

O. hyalinipennis is more abundant in the direction of Lake Chad, while *D. supersticiosus* is prevalent in the southern part of the country as far as Oubangui. Their spread is favoured by weeds.

Control methods — Frequent weeding, increase of spaces in the crops, collection of insects.

The weekly collection of cotton bolls diminishes the importance of the damage to the seeds.

The growth of maize as a trap crop has given remarkable results.

(5) *Aphis gossypii*, Glov.

ACARINA. — *Eriophyes gossypii*, Bks.

II. "Mosaic". This disease is very rare. Boll rot, fairly frequent. False anthracnose follows the attacks of Hemiptera during periods of great humidity.

Scotland: Notes on Plant Diseases and Pests (1).

1. The following diseases and pests were especially prevalent in the year 1925:—

(1) Communication from the Board of Agriculture for Scotland, Edinburgh, official correspondent to the Institute.

(1) Raspberry canker (*Nectria rubi*), which is believed to have appeared for the first time in Great Britain, and which was prevalent in the north of Scotland.

(2) A disease of strawberries (first noted in 1920), which caused much loss in the strawberry-growing district of Lanarkshire, and which is believed to be due to a fungus of the species *Pythium*. Further investigation is being carried on.

(3) The moth *Argyresthia conjugella*, which appeared for the first time in Scotland and caused severe loss among apples.

(4) *Psila rosae* (not new), which caused damage to parsley seedlings in the Lothians.

II. No new disease or pest appears to have been recorded in 1926. The following fungus diseases were prevalent:—

Phytophthora cryptogea on tomatoes and herbaceous plants;

Plowrightia ribesia on red and black currants; *Uromyces betae* on beetroot and sugar beet; *Puccinia Pringsheimiana* on gooseberries — almost epidemic;

Cronartium ribicola on black currants and white or Weymouth pine; *Phoma betae* on seedling beet;

Bacillus lathyri on broad and field beans.

West Indies : Notes on the Prevalence of Insect Pests, June 1927 (1)

Sugar-cane. — The Froghopper of sugar cane (*Tomaspis saccharina*) as a serious pest is confined to Trinidad. The very unusual amount of rain which has fallen in the first six months of this year (this period usually includes the dry season), appears materially to have altered the normal course of procedure in the development of the Froghopper. It is usual for the Froghopper to appear in numbers at about this time, in what is known as the first brood, but this year there has been a continuous breeding with no dry period sufficient to cause a hibernation. Froghoppers have been present in many cane fields throughout the season, although not in great abundance, and without causing characteristic blighting to any noticeable extent. The development of this insect as the season advances will be watched with a good deal of interest.

As a result of the experiments carried out last season, Cyanogas (Calcium cyanide) is being extensively used for the destruction of nymphs, being applied as a dust at the base of the cane plants.

Professor HARDY has stated that it appears certain that certain conditions of soil acidity in the cane fields are associated with severity of attacks by Froghopper, and severity of blighting of the sugar cane leaves.

Cotton. — The unusually severe attacks of the Cotton leaf ca-

(1) Communication from the official correspondent to the Institute, Prof. H. A. BALLOU, Commissioner of Agriculture, Imperial College of Tropical Agriculture, Trinidad.

terpillar (*Alabama argillacea*) throughout the West Indies in the 1926 season caused cotton planters to look forward with considerable apprehension to attacks of similar severity in 1927. Up to the present time reports received indicate that although the caterpillars appeared in the fields as early as May, no severe attacks had been experienced up to the end of June.

Appearances of pink bollworm (*Pectinophora gossypiella*) were recorded during June, but the insects were few.

Rumania : Experiment Trials on Formol Treatment of Sugar Beet Seed (1).

The disease known as bacterial gummosis of beet, which is produced, as is known, by an association of bacteria, appeared in the summer of 1924 in sugar beet crops in Rumania, especially in the valley of the Danube. The losses incurred by beet growers and sugar manufacturers were, for the year in question, from 60-70 % rising in some places as high as 100 %.

Attempts made to cultivate these bacteria taken directly from affected plants show that the disease is produced by a coccus. For a thorough investigation of the disease field trials have been made. These were started in the summer of 1924 and were made on 14 plots, each 15 metres square. The plots were worked to a depth of 25 cm. and were then sown with sugar beet seed provided by five sugar beet seed farms. For each lot of seed there were two plots. In one of the plots the seed was treated first with a solution of commercial formol at 0.025 % strength, the seed being immersed for an hour. It was then put in the sun to dry but sown while still wet. The sowing was done on the same day and under the same conditions on all the plots, the distance between the rows being 35 cm. and the lines sown running north and south. Field observations have shown that the formol treated seed germinates at once while the untreated seed germinates 2-4 days later. The plants in the plots sown with treated seed were more vigorous during the whole of their growth, their development was obviously better, and their appearance was finer. They produced a rosette of larger and more crinkled leaves of a deeper green.

In summer the beets were damaged by hail, especially those on the treated plots, owing to the fact that their leaves being greater offered a larger surface to the hail. However, a later observation showed that these plants picked up and revived more quickly than the others growing in the plots sown with non-treated seed. During harvest, each root was weighed separately and the roots of each plot were also weighed. A series of variations in the weights of the roots on each plot was thus obtained, from which the following figures were calculated :—

(1) Communication from the official correspondent to the Institute, Professor Tr. SAVULESCU, in collaboration with Mr. C. SANDU (Phytopathological Laboratory of the Agricultural College at Herestrau-Bucharest).

Plot —	No of specimens analysed	Total Weight kg	M	T	cm	Note
I	128	64 67	518 75	328	29	The letter F beside the number of the plot indicates that it has been treated M = the average weight of a specimen in grammes T = standard variation cm = average error
I F	131	56 62	634	290	25 35	
2	131	70 71	557 6	335	29 28	
2 F	118	78 13	607 6	271	24 91	
3	121	58 8	530 1	227	25 18	
3 F	136	82 95	560 3	291	25 06	
4	132	68 77	524 2	261	24 62	
4 F	134	98 17	700	133	37 65	
5	124	77	640 4	312	27 58	
5	129	95 87	763 3	367	32 33	
6	132	69 74	511 66	309	26 91	
6 F	116	83 09	562 3	296	24 53	
7	129	65 60	492 9	261	23 25	
F	131	75 95	564 1	303	26 46	

It will be seen from the data of this general table that the plots sown with formol-treated seed give a considerably increased yield. Chemical analysis also shows an increased sugar content of the roots from treated seed. As all the plots were treated in the same way during their growth period and as the only variable factor was the formol treatment, this treatment may be definitely considered as the one and only factor producing difference in results. Formol brought into the soil by the seeds acts as a disinfectant, bringing about a partial disinfection only by reason of its weak concentration.

LEGISLATIVE AND ADMINISTRATIVE
MEASURES

England. — The Ministry of Agriculture and Fisheries has been informed that the Committee of Agriculture of the Island of Jersey has prohibited the importation into the island of any potatoes of varieties which are susceptible to Wart Disease.

Consignments of immune varieties must be accompanied, as before, by a sworn statement by the shipper, indicating the farm where the potatoes were grown, and declaring that no case of Wart Disease has occurred on the farm, and this statement must be supported by an official certificate that no case of Wart Disease has occurred during the past three years within a distance of at least 500 yards. Application for the issue of this certificate in connection with the export to Jersey of potatoes grown in England should be made to the Ministry of Agriculture and Fisheries, 10, Whitehall Place, London, S. W. 1.

A charge of one shilling is made for each certificate issued. (*The Gardeners' Chronicle*, London, 1927, vol LXXXII, no. 2125, p. 222).

Brazil (1). — By Law of 21 July, 1927 and in furtherance of the objects of Art. 31 of the plant health control Regulation approved by Decree No. 15,189 of 21 December, 1921, the State of Parahyba do Norte has been declared a zone infested by *Cerococcus parahybensis* Hempel, a scale parasite of coffee, commonly known as "vermelho".

In the manner indicated by Art. 32 of the above Regulation exportation from this State into every other State in Brazil both by sea and by land has been prohibited, not only of whole plants and of other living parts of the coffee plant but also of every other plant capable of acting as carrier of the scale.

Belgian Congo (2) — I. The Governor General has established by Ordinance of 25 March, 1927, a regulation relating to the control of insects and cryptogamic parasites on certain annual and biennial plants. This regulation stipulates in the first place that the competent Services may, with the object of preventing infection, order the immediate destruction, by means which they prescribe, of standing crops, crop products or remains of crops attacked by disease or by insects which cannot otherwise be controlled.

(1) Communication from the official correspondent to the Institute, Dr. Carlos MOREIRA, Director of the " Instituto Biologico de Defesa Agricola " of the Ministry of Agriculture, Industry and Commerce, Rio de Janeiro

(2) Communication from the official correspondent to the Institute, Dr. Pierre STANER, Director of the Mycological Laboratory at Eala

II. To limit the invasion of the banana borer (*Cosmopolites sordidus*), which seems to be threatening all the banana plantations, three Ordinances were issued, the first on the 26th May, 1922 by the Governor of the Province of Congo-Kasaï, the second on the 29th March, 1926, by the Governor of the Eastern Province, the third on the 14th January, 1927 by the Governor of the Equatorial Province.

These Ordinances prohibit the importation and transit in the said Provinces of young plants, shoots, bulbs, stems or parts of stems of bananas coming from places where the beetle has been noted as well as from Colonies bordering on these regions.

III. An Ordinance of 31 December, 1921 issued by the Governor of Congo-Kasaï and another of 24 April, 1922 issued by the Governor of the Eastern Province, interdict the importation of citrus fruits and of potatoes coming from the Province of Katanga.

IV. To protect cotton crops from the attack of insects or cryptogamic parasites, the Governor General, by Decree of 1 August, 1921, orders cotton planters :—

(1). to destroy on their lands and on vacant lands within 500 metres of these lands, all wild cotton plants, whether self-sown or ratoon plants, and to do so before the growing period of the planted lands.

(2). to top and destroy on the lands the cotton bushes, bolls and remains of cotton plants attacked by diseases or insects.

(3) to destroy by fire after the harvest all cultivated cotton plants existing on these lands and to collect and burn the cotton bolls lying on these lands.

V. An Ordinance made by the Governor General on 1 May, 1923 regulates the importation of cotton by prohibiting the introduction of cotton seed, of unginned cotton and of raw ginned cotton coming from the Sudan, French Equatorial Africa, Uganda, Kenya, Northern Rhodesia, the Territories of Ruanda-Urundi or Tanganyika Territory.

French Indochina. — By virtue of the Governor General's Decree of 1 July, 1927, touching the reorganization of the Agronomic Research Institute of Indochina, the branches of this Institute which are concerned with the territories of Cambodia, Cochin China and South Annam are grouped in one section called the "Section Sud-indochinoise" with headquarters at Saigon. Those concerned with the territories of North Annam, Laos and Tong-King form the "Section Nord-indochinoise", with headquarters at Hanoi. The two sections also include a Phytopathological Division, while the former also comprises a Genetics and a Plant Quarantine Division.

The Agronomic Research Institute is placed under the technical and scientific control of the "Institut National d'Agronomie Coloniale en France". Its relations with the latter, particularly in the matter of plant health control regulations, are governed by the Decrees and Instructions of the Minister for the Colonies. (*Journal officiel de l'Indochine française*, Hanoi, 6 juillet 1927, 39^{ème} année, n° 54, p. 1879-1880).

* * In virtue of a Decree of the Governor General of 1 July, 1927, the Plant Sanitary Control Service in Indochina has the following duties :—

(1) The investigation of plant diseases and insect pests and the study of the means of control ;

(2) The application as regards both imports and exports and also within the country itself of the regulations of plant sanitary control.

The importation and exportation of plants and accompanying soils and transport materials referred to in the regulations for plant sanitary control can be carried out at ports actually nominated by Decree of the Governor General.

In each of these ports effect is given to the sanitary control regulations by the following means :—

(a) The Entomological and Phytopathological Laboratories belonging to the Institute for Agricultural Research in Indochina ;

(b) Disinfection Centres and Quarantine Stations attached either to the Institute or to a local Agricultural Service.

The work is under the supervision of a Phytopathological Inspector who has under his charge the Entomological and Phytopathological Laboratories at the Institute and is directly responsible for the Disinfection Centres and Quarantine Stations.

An authorization for the entry into Indochina or for the delivery from the Disinfection Centres or Quarantine Stations is not regarded as valid unless accompanied by a bill of health issued by the Phytopathological Inspector. This Inspector is alone authorized to grant similar certificates in the case of exportation.

The internal sanitary Service is arranged as follows :—

(1) The carrying out of all rules relating to the investigation of plant diseases and insect pests, the organization of the means of control and the application of the regulations for plant sanitary control are entrusted to Phytopathological Officers specially appointed for the countries of Indochina and attached to the Agricultural Services.

This staff has the assistance of the Entomological and Phytopathological Laboratories of the Institute for Agricultural Research for all studies and investigations of a scientific character

(2) The supervision of plant sanitary control is entrusted to the Phytopathological Inspectors attached to the Institute of Agricultural Research.

Each Inspector exercises his control for the area of a sanitary division as shown in the Order of the Governor General and under the following conditions :—

(a) The Inspector is responsible, acting permanently on behalf of the Inspector General of Agriculture, Stock Breeding and Forestry for the technical and vocational supervision of the Phytopathological Officers and also for the supervision of the application of the regulations for plant sanitary control.

(b) He collects all the notices, information and reports relating to the sanitary conditions of the crops.

The Inspectors and Phytopathological Officers are recruited from the

staff of the technical and scientific Agricultural Services in Indochina, after having completed a probationary period of at least six months in the specialised Laboratories of the Ministry of Agriculture or of the National Institute of Colonial Agriculture in France. They are nominated by the Governor General and are alone competent to give effect to the regulations for plant sanitary control.

They may be called on by order of the Governor General to serve temporarily outside the country to which they are assigned, should circumstances require.

The Disinfection Centres and Quarantine Stations are established by Orders of the Governor General. Their internal regulations are arranged by the General Inspector of Agriculture, Stock Breeding and Forestry. (*Journal officiel de l'Indochine française*, Hanoi, 6 juillet 1927, 39^{ème} année, n^o 54, p. 1880-1881).

*** In virtue of an order of the Governor General of 1 July, 1927 the port of Saigon is now open for the importation and exportation of plants, soils and transport materials referred to in the regulations for Plant Sanitary Control.

The application of these regulations to imports and exports will be carried out as follows.—

(1) The Entomological and Phytopathological Laboratories of the Institute of Agricultural Research at Saigon are made responsible for all the details of the sanitary inspection of plants, soils and transport materials referred to in the regulations,

(2) a disinfection centre is attached to the Institute,

(3) the Station of Giaray is made a plant quarantine station.

The sanitary section controlled by the Phytopathological Inspector attached to the Institute of Agricultural Research at Saigon includes the countries of Cochinchina and Cambodia and also the districts under the control of the Residences at Phan-thiét, Phan-ri, Phan-rang, Nha-trang, Dalat, Banmethuot and Kontum in the country of Annam (*Journal officiel de l'Indochine française* Hanoi, 6 juillet 1927, 39^{ème} année, n^o 54, p. 1881).

Italy. - By virtue of Royal Decree, No. 1415, of 5 August, 1927, relating to easements in the conditions and rates in force on the State railways, the percentage increase has been reduced to 350 % for the following named articles: anticryptogamic, antiphylloxera and antimildew preparations, cupric sulphur (*Gazzetta ufficiale del Regno d'Italia*, Roma, 16 agosto 1927, anno 68^o, n. 188, pp. 3321-3322).

*** Following the presence of grape phylloxera [*Phylloxera vastatrix*] which has been determined in the Commune of Cupramontana in the Province of Ancona, a Decree of 31 August, 1927 has extended to the territory of the above Commune the rules contained in arts. 10-14 of Regula-

tion, No. 1099, of 13 June, 1918, relating to the exportation of such materials as are indicated in nos. 1, 2, 3 and 4 of art. 10 of the same Regulation. (*Gazzetta ufficiale del Regno d'Italia*, Roma, 5 settembre 1927, anno 68º, n. 205, p. 3620).

* * In consequence of the presence of grape phylloxera [*Phylloxera vastatrix*] which has been determined in the Communes of Castelvechio Subequo and of Castel di Jeri, in the province of Aquila degli Abruzzi, a Decree of 31 August, 1927, has extended to the territories of the above Communes the rules contained in arts. 10-14 of Regulation, No. 1099, of 13 June, 1918, relating to the exportation of such materials as are indicated in nos. 1, 2, 3 and 4 of art. 10 of the same Regulation. (*Gazzetta ufficiale del Regno d'Italia*, Roma, 9 settembre 1927, anno 68º, n. 209, p. 3707).

RECENT BIBLIOGRAPHY

Appel, OTTO Forderungen und Aussichten der angewandten Botanik. *Berichte der Deutschen Botanischen Gesellschaft*, Berlin-Dahlem, 1927, Bd XLIV Jahrg 1926, S. (65)-(80).

[Deals in detail with phytopathological questions].

Azanza Azcona, A La apoplejía de la viña y su tratamiento. *El Progreso Agrícola y Pecuario*, Madrid, 1927, año XXXIII, núm 1478, págs. 222-223, 1 fig.

Babcock, KENNETH W. The European corn borer *Pyrausta nubilalis* Hübner: I. A discussion of its dormant period. *Ecology*, Brooklyn, N Y, 1927, vol VIII, no. 1, pp. 45-59.

Bajo, FEDERICO La «lagarta» como plaga de los frutales. *La Revista Vinícola y de Agricultura*, Zaragoza, 1927, año XI, V, núm 6, págs 85-86

[*Lepus dispar*]

Barbey, A La fidonie du pin combattue à l'aide de l'avion. *Revue des Eaux et Forêts*, Paris, 1927, tome LXV, nº3, p 109-111, 2pl

[*Fidonia pinaria* L.]

Basinger, A. J. The eradication campaign against the white snail (*Helix pisana*) at La Jolla, California. *Monthly Bulletin of the Department of Agriculture, State of California*, Sacramento, California, 1927, vol. XVI, no 2, pp 51-77, fig 9-31.

Bodenheimer, F. S. Ein Befall von *Evetria buchana* var. *thurifera* Led. in Pinienbeständen des Karmel (Palästina). *Zeitschrift für angewandte Entomologie*, Berlin, 1927, Bd XII, Heft 3, S. 473-483, Abb. 1-4.

Brouwer. Landwirtschaftliche Samenkunde Ein Schlüssel zum Bestimmen der kleinkörnigen Kultursamen sowie der wichtigsten Unkraut samen. Neudamm, J Neumann, 1927 130 S., 2 Textabb., 14 Taf

Brunet R. La lutte contre l'altise. *La Vie Agricole et Rurale*, Paris, 1927, 16^e année, t. XXX, n^o 23, p. 304, 3 fig.

[*Haltica ampelophaga*]

Caldis, PANOS D. Etiology and transmission of endosepsis (internal rot) of the fruit of the fig *Hilgardia*, Berkeley, California, 1927, vol. 2, no. 7, pp. 287-328, fig. 1-3, pl. 1-16.

[*U. usarium moniliforme* Sheldon var. *Fici* n. var.].

Carimini, MARIO Difesa contro la mosca delle frutta. *Il Lavoro d'Italia Agricola*, Roma, 1927, anno I, n. 22, p. 4

[*Ceratitis capitata*]

Colley, REGINALD H., Hartley, CARL and Taylor, MINNIE W. A morphologic and biometric comparison of *Cronartium ribicola* and *Cronartium occidentale* in the aecial stage. *Journal of Agricultural Research*, Washington, D. C., 1927, vol. 34, no. 6, pp. 511-531, fig. 1-5

Chittenden, F. H. The Florida potato plant-bug. *The Quarterly Bulletin of the State Plant Board of Florida*, Gainesville, Florida, 1927, vol. XI, no. 3, pp. 115-118, fig. 1-2

[*Coreocoris diffusus* Say]

Criddle, NORMANN. Lepidoptera reared in Manitoba from poison ivy. *The Canadian Entomologist*, Orillia, 1927, vol. LIX, no. 5, pp. 99-111

[*Paeetes oculatrix* Guér., *Epipaschia zelleri* Grt., *Episimus argutus* Clem., *Cacoecia argyrospila* Walk., *Lithocolletis guthriei* Clem. and *Gracilaria rhodostella* Cham., reared from *Rhus Toxicodendron*]

Cook, H. H. Eelworm disease of Chrysanthemums. *The Gardeners' Chronicle*, London, 1927, vol. LXXXI (third series), no. 2111, p. 415, fig. 203.

[*Aphelenchus rusema-bosi* ?].

Cook, MELVILLE T. Relationship of cane varieties to diseases. *The Planter and Sugar Manufacturer*, New Orleans, 1927, vol. LXXVIII, no. 18, pp. 352-353

Dastur, JEHANGIR FARDUNJI. A short note on the foot-rot disease of pan in the Central Provinces. *The Agricultural Journal of India*, Calcutta, 1927, vol. XXII, part II, pp. 105-108.

[*Phytophthora parasitica* on *Prper Betel*].

de Laval, J. A. El « pasmo » del algodón en el valle de Ica. *Boletín de la Compañía Administradora del Guano*, Lima, Peru, 1927, vol. III, no. 1, págs. 3-11, figs. 1-3.

[“Pasma” or checked development of the cotton bolls can be attributed to pathological causes (*Homalodisca triquetra* Fabr., *Dysdercus suturalis*, *Calocoris raptidus*, *Glomerella Gossypii*, *Bacillus gossypinus*, *Collatrichum Gossypii*, *Fusarium*, *Alternaria*, *Rhizotrichum macrosporum*, *Anthonomus vestitus*, etc.), but also to physiological causes such as sudden changes in temperature raising of the soils water level].

Dillon Weston, W. A. R. The incidence and intensity of *Puccinia glumarum* Eriks. and Henn. on wheat infected and non-infected with *Tilletia tritici* Winter, showing an apparent relationship between the susceptibility of wheat plants to yellow rust and to hunt. *The Annals of Applied Biology*, London, 1927, vol. XIV, no. 1, pp. 105-112, diagram 1

Di Tocco, ROBERTO. Bibliografia del filugello (*Bombyx mori* L.) e del gelso (*Morus alba* L.) compilata nella R. Stazione Bacologica Sperimentale - Padova per cura del Dott. . . . Ente Nazionale Serico-Milano. Padova, C. I. D. A. M., Casa Editrice Dott. A. Milani (già Litotipo), 1927, XXI+262 pp.

[It deals with foreign studies after 1856 on the diseases and pests of the mulberry tree are included]

Drechsler, CHARLES. Two water molds causing tomato rootlet injury. *Journal of Agricultural Research*, Washington, D. C., 1927, vol. 34, no. 3, pp. 287-296, fig. 1-2.

[*Aphanomyces euteiches* Drech., *Plectospora myriandra* n. gen. and n. sp.].

Dukelsky, N. Notices sur les rongeurs nuisibles à Bokhara. *La Défense des Plantes*, Leningrad, 1927, vol. IV, n^o 1, p. 59-61.

[Russian with French title].

Dunnam, E. W. Notes on the life history and control of the strawberry leaf roller. *Journal of Agricultural Research*, Washington, D. C., 1927, vol. 34, no. 2, pp. 149-156, fig. 1-3.

[*Ancylys complana* Fröhl.].

Durand, A. Le traitement du mildiou. *La Vie Agricole et Rurale*, Paris, 1927, 16^e année, t. XXX, n^o 23, p. 368

[*Plasmopara viticola*].

Engelhardt, V. Sur les Lamellicornes nuisibles dans l'agriculture de l'Extrême Orient *La Défense des Plantes*, Leningrad, 1927, vol IV, n°1, p 4-9, fig 1-3

[Russian with French title].

Eratokritos, I Cereal disease «Sirividihi» (*Oecophora temperatella*). *The Cyprus Agricultural Journal*, Nicosia, Cyprus, 1927, vol XXII, part 2, p 45

Escherich, K Die Bekämpfung des Kaffeeborkenkäfers in Staat São Paulo *Zeitschrift für angewandte Entomologie*, Berlin 1927, Bd XII, Heft 3, S 493-498, Abb 1-4

[*Stephanoderes coffeae* Hag]

Esdorn, ISE Ueber die Prüfung von Beizmitteln *Pflanzenbau*, Berlin, 1927, 3 Jahrg 1926/27 Nr 17, S 276

Ferraris, T Le ruggini del pero e del cotogno *Curiamo le Piante I e La Difesa delle Piante contro le Malattie ed i Parassiti*, Alba, 1927, anno IV e XXII, n 5, pp 91 95, figg 1-2, tav V

[*Gymnosporangium sabinae*, *Gymn confusum*]

Fischer, W Die Notwendigkeit der Schaffung eines zwischenstaatlichen Kartoffelkrebsabkommens. *Deutsche Landwirtschaftliche Presse*, Berlin, 1927, 51 Jahre, Nr 10 S 131-132

Friederichs, K Die Bedeutung der Bioconosen für den Pflanzenschutz gegen Tiere *Zeitschrift für angewandte Entomologie*, Berlin 1927, Bd XII, Heft 3, S 385-411

Froggatt, WALTER W Forest insects, No 29 The bubble leaf gall thrips (*Kladothrips* sp) *The Australian Forestry Journal*, Sydney, 1927, vol X, no 1, pp 5-7, 1 fig

Fulton, HARRY R and Bowman, JOHN J Effect of spraying with fungicides on the keeping quality of Florida citrus fruits *United States Department of Agriculture, Department Circular 409*, Washington, D C, 1927, 13 pp, 5 figs

Gasser. Die Taschenkrankheit bei den Zwetschgen, deren Ursache und

Bekämpfung. *Schweizerische Obst- und Gartenbau-Zeitung*, Munsingen, 1927, Nr 11, S 100-191, 1 Abb
[*Taphrina Pruni*].

Gimingham, C T A parasite of grain weevils *Journal of the Institute of Brewing*, London, 1927, vol XXXIII, no 4, pp 241-242

[*Lariophagus distinguendus* Parasite of *Calandra granaria* and *C oryzae*]

Gioelli, FELICE Sopra un caso di flusso mucoso riscontrato su aceri e ippocastani *Rivista di Patologia Vegetale*, Pavia, 1927, anno XVII, nn 5-6, pp 109 114, 1 fig

[The cause of the deterioration is not yet determined]

Greger, JUSTIN Mikroskopie der landwirtschaftlichen Unkrautsamen Mit besonderer Berücksichtigung der Frucht- und Samenschale Beilin, Paul Parcy, 1927, VII-117 S, 106 Text-abb

Lecomte, H Sur le *Viscum Perrieri* H Lec, de Madagascar *Bulletin du Muséum National d'Histoire Naturelle*, Paris, 1927, année 1927, n°1, p. 99-101, fig 1-14

Safro, V I Adapting fumigation procedures to industrial needs *Journal of Economic Entomology*, Geneva, N Y, 1927, vol 20, no 2, pp 261-266

Salmon, E S. and Ware, W. M. Leaf scorch of *Azalea*. A new fungous disease *The Gardeners' Chronicle*, London, 1927, vol LXXXI, third series, no 2104, pp 286-288, fig 139-143.

[*Uromyces Azaleae* Vogl found on azalea imported into England]

Salmon, E S and Ware, W M Root rot of *Richardia* (*Richardia* = *Calla* and *Arum*) A new fungous disease *The Gardeners' Chronicle*, London, 1927, vol LXXXI, third series, no 2101, pp 234-235, fig 116-119.

[*Phytophthora Richardiae* Bowman, new to England]

Salmon, E S and Ware, W M The downy mildew of the hop in 1926. *The Journal of the Ministry of Agriculture*, London, 1927, vol XXXIII, no 12, pp 1108-1121, fig 1-5

[*Pseudoperonospora Humuli*]

Salter, ROBT. M. and Thatcher, L. E. Agronomic research on the European corn borer in Ohio *Journal of the American Society of Agronomy*, Geneva, N Y, 1927, vol 19, no 2, pp 137-153, fig 1-7

[*Pyrausta nubilalis*.]

Samuel, GEOFFREY On the shot-hole disease caused by *Clasterosporium carpophilum* and on the «shot-hole» effect *Annals of Botany*, London, 1927, vol XLI, no. CLXII, pp 375-404, fig 1-18, pl XVII-XVIII.

Schander, Stolze und Rothmaler. Beiträge zur Frage der Trockenbeizung und zur Methodik der Untersuchung von Trockenbeizmitteln. *Pflanzenbau*, Berlin, 1927, 3. Jahrg. 1926/27, Nr 6, S 241-260, Abb 1-10

Schmidt, PAUL Der kleine Frostnachtspanner *Schweizerische Obst- und Gartenbau-Zeitung* Munsingen, 1927, 29 Jahrg - 40 Jahrg, Nr 7, S 111-112, 1 Abb

[*Chematobia brumata* L.]

Schoevers, T A C International Committee of Phytopathology and Economic Entomology Report of the Secretary 1 January 1925-1 May 1927 Editor: T A C SCHOEVERS, Secretary of the Committee Wageningen, H Veenman and Sons, 1927, 8pp

Schwarz, M BEATRICE Preliminary results of a rotation test in connection with slime disease (*Bacterium solanacearum*) *Landbouw. Buitenzorg*. 1927, II jaarg, no 7, blz 576-586, fig 1-3, tabel I-II

[In Dutch, with title and summary in English]

Sherbakoff, C A A modified method of delinting cotton seed with sulphuric acid *Phytopathology*, Lancaster, Pa., 1927, vol 17, no 3, pp 189-193

Siegler, F. H and Brown, LUTHER Can baits be used in scouting for injurious insects? *Journal of Economic Entomology*, Geneva, N Y, 1927, vol 20, no 2, p 428-429

[*Carpocapsa pomonella* L., *Laspeyresia molesta* Busk]

Small, W. Mycological notes. Further notes on *Rhizoctonia bataticola*

(Taub) Buttler *The Tropical Agriculturist*, Colombo, 1927, vol LXVIII, no 2, pp 73-75, 1 pl

Smolák, JAR Résultats de la désinfection des semences avec des désinfectants secs *Věstník Československé Akademie Zemědělské*, Praha, 1927, Duben 1927, Ročník III, Císlo 4, str 441-443

[Against «stinking» mild of wheat. In Czech, title also in French, summary in French, English and German]

Snapp, OLIVER I. Spraying and dusting program for Southeast *American Fruit Grower Magazine*, Chicago, Ill., 1927, vol XLVII no 2, pp 34-35

Southwell, H Virus diseases of potatoes and the raising of seed potatoes in the Irish Free State *The Journal of the Ministry of Agriculture*, London, 1927, vol XXXIV, no 1, pp 10-25

Stahl, C F A preliminary report on a grass-root mealybug (*Ripersia radicola* Morrison) affecting sugar cane in Cuba *Journal of Economic Entomology*, Geneva, N Y, 1927, vol 20 no 2, pp 397-399, fig 18, pl 13

Szymanek, J Quelques observations sur la morphologie du mycélium et des suçoirs du *Phytophthora infestans* dans le tubercule de pomme de terre *Comptes rendus hebdomadaires des séances de l'Académie des Sciences*, Paris, 1927, tome 184, n°10, p 620-622, fig 1-5

Talbert, T J Spray calendar for the Middle West *American Fruit Grower Magazine*, Chicago, Ill., 1927, vol XLVII. no 2, p 14

Tate, P On *Ectomyces Calotermi* n sp an Ascomycete parasitic on *Caltermes samoanus* Holmgren (*Isoptera, Protermitidae*) *Parasitology*, London 1927, vol 19, no. 1, pp 54-60, fig 1, pl II

Thompson, W R and Parker, H L. The problem of host relations with special reference to entomophagous parasites *Parasitology*, London, 1927, vol 19 no 1, pp 1-34

Tisdale, W H, Leighty, C E and Boerner, E G A study of the distribution of *Tilletia tritici* and *T.*

laevis in 1926 *Phytopathology*, Lancaster, Pa., 1927, vol 17, no 3, pp 167-174, fig 1

[In the United States of America]

Trotter, A Sulla presenza della «*Lasiodiplodia tubericola*» Fil et Evr in Egitto («*Java Black Rot*») e sul pericolo della sua introduzione in Italia *Bollettino della R Stazione di Patologia vegetale* [di Roma], Firenze, 1927, anno VII, nuova ser., n 1, pp 93-98, figg 1-4

[*L. tubericola* has been found at the Customs of Naples on tubers of sweet potatoes (*Ipomoea Batatas* Poir.) coming from Egypt]

Truelle, A La destruction de l'hyponomeute du pommier *La Vie Agricole et Rurale*, Paris, 1927 16^e année, t XXX, n° 16, p 253-255, 2 fig
[*Hyponomeuta malinellus*]

United States Bureaus of Entomology and Plant Industry. Oil emulsions for scale on peach trees *American Fruit Grower Magazine*, Chicago Ill., 1927 vol XLVII no 2 p 17

[*Aspidiotus perniciosus*]

Vernano, C Necessita della lotta contro la tignuola dell'uva *L'Agricoltore d'Italia*, Roma, 1927, anno VI, n ser., n 19 p 2

[*Conchylus ambigua*]

Vielwerth, V Résultats de la désinfection des semences en Slovaquie *Věstník Československé Akademie Zemědělské*, Praha, 1927, Duben 1927, Ročník III, Číslo 4 str 443-445

[A fungus «stinking smut» of wheat In Czech title also in French summary in French English and German]

v. Soó, RALPH The *Melampyrum* species of East Asia *The Journal of Botany British and Foreign*, London, 1927, vol LXV, no 773, pp 138-145

[Are given among others, the Latin diagnosis of *M. aristatum* Soó comb nov *M. Henryanum* Soó comb nov *M. Klebsbergianum* Soó sp nov. *M. japonicum* Soó comb nov]

Vyshelessky, N Sodium arsenite as insecticide *La Défense des Plantes*, Leningrad, 1927, vol III, no 6, pp 462-467

[In Russian with title and summary in English]

Vyshelessky, N On the behaviour of locusts amidst the dusted plants *La Défense des Plantes*, Leningrad, 1927, vol III, no 6, p 533

[In Russian with title and summary in English]

Vyshelessky, N Experiences on the adhesive property of insecticides and their admixtures *La Defense des Plantes*, Leningrad, 1927, vol III, no 6, pp 534-536

[In Russian with title and summary in English]

Wille, F Untersuchungen über die Beziehungen zwischen Immunität und Reaktion des Zellsaftes *Zeitschrift für Pflanzenkrankheiten u Pflanzenschutz*, Stuttgart, 1927 XXXVII Bd. Heft 5/6, S 129-158, Abb 1-3

Wilson, MALCOLM Defoliation of the Douglas fir *The Gardeners Chronicle* London, 1927, vol LXXXI, third series no 2106, pp 323 324

[*Rhabd cline Pseudotsugae* is indicated as agent of the disease it had already been observed in Scotland and has recently been found in England (Hampshire)]

NOTES

Phytopathological Instruction and Phytosanitary Propaganda. —

At the request of the German Ministry of Food and Agriculture and with the technical assistance of the Biological Institute for Agriculture and Forestry at Berlin - Dahlem, the 'Deutsche Hochbild Gesellschaft m b H' (Address Munich, Rheinbergerstrasse 5) has prepared three sets of wall pictures showing in relief and colour the most important diseases and pests of cereals, beet and fruit trees

STATISTICS

The Worlds Wheat Supplies and Requirements from 1st August 1927 to 31st July 1928 (1)

I. -- QUANTITY AVAILABLE FOR EXPORT.

On the basis of statistical information at hand, the quantity of wheat theoretically available for export at 1st August 1927 amounted to about 10,200 thousand metric tons for Canada, 6,300 for the United States, 100 for India, 1,250 for Argentina and 750 for Australia: or altogether a total of about 18,600 thousand metric tons will cover the available outside supplies from which import countries can draw for their needs during the commercial years 1st August 1927 to 31st July 1928. To these quantities representing the surplus available in the above mentioned export countries at the beginning of the season must be added: 1) the quantity that may probably be exported by a series of other surplus wheat producing countries in the Northern Hemisphere; 2) the probable exportable surplus of the new crops of the Southern Hemisphere which are at present ripening and which will be cut towards the end of the present year and the beginning of next year.

Besides Canada, the United States and India, the following countries of the Northern Hemisphere have an export surplus: Bulgaria, Kingdom of the Serbs, Croats and Slovenes, Hungary, Rumania, U. S. S. R., and Algeria. The export surplus of these countries can only be roughly estimated, as data relating to their stocks are non existent; their *apparent* consumption (calculated from the figures of production and trade) has considerably fluctuated in recent years, therefore no reliable estimate of their probable requirements for the present season can be based on these figures. Taking into account all the information available it is regarded as likely that these countries will export during the season 1927-1928 about 1,500 thousand metric tons.

(1) Definitions of the various terms employed and details of the data used in calculating the estimates given in this article will be found in the "*International Crop Report and Agricultural Statistics*" of November, 1927.

TABLE I — *Wheat (grain and flour reduced to equivalent in grain). Quantities exportable on 1st August 1927.*

(Thousand metric tons)

COUNTRIES	Total quantities available at the opening of the current season (*)			Estimated consumption during the current season (*)	Quantities available for export at the opening of the current season (*)	Exports from the beginning of the current season (*) until 31st July 1927	Quantities available for export on 1st August 1927
	Yield in the crop-year Northern Hemisphere 1927 Southern Hemisphere 1926-27	Exportable Stocks on and at the opening of the current season (*)	Totals				
Canada	12,090	1,130	13,220	3,000	10,220	—	10,220
United States	21,580	540	24,120	17,500	6,620	310	6,310
India	9,090	200	9,290	9,000	290	220	70
Argentina	6,010	960	6,970	2,100	4,870	3,620	1,250
Australia	4,380	—	4,380	1,200	3,180	2,420	760
Total	55,150	2,830	57,980	32,900	25,180	6,570	18,610

(*) The current season is defined as follows —

From 1st August 1927 to 31st July 1928 for *Canada*From 1st July 1927 to 30th June 1928 for the *United States*,From 1st April 1927 to 31st March 1928 for *India*,From 1st January to 31st December 1927 for *Argentina* and *Australia*

As far as concerns the new crops of wheat in the Southern Hemisphere, prospects are favourable in Argentina, but less satisfactory in Australia. Although official estimates of production are still lacking, and while it is early yet to give any definite opinion, it is probable according to present crop conditions in these two countries, that their exportable surplus will amount to 6 million metric tons.

Consequently, the total quantity theoretically available for the requirements of importing countries during the commercial year 1st August 1927 to 31st July 1928 would amount to about 26 million metric tons.

II — REQUIREMENTS OF IMPORTING COUNTRIES.

An approximate idea of the probable requirements of importing countries for the season 1927-1928 can be gathered by an examination of Table II, where on one side is shown the production, imports, and apparent consumption of the importing countries for the last three seasons and on the other the 1927 production.

While the aggregate wheat production of these countries was higher in 1927 than in 1926 it is quite probable that they will have to import less than last year. This supposition seems still more likely when due emphasis is given to the larger output of potatoes and rye this year. If the wheat consumption in the countries under consideration amounts to the apparent consumption of the season 1926-27, they will have to import about 16 million metric tons. On the other hand it must be remembered

TABLE II — Wheat (grain and flour reduced to equivalent in grain)

The Apparent Consumption of Importing Countries in the season from August 1, 1924 to July 31, 1925, August 1, 1925 to July 31, 1926 and August 1, 1926 to July 31, 1927, Compared with the Production of Wheat in 1927

(thousand metric tons)

COUNTRIES	Production in 1924	Imports 1924-1925	Apparent Consumption 1924-1925	Production in 1925	Imports 1925-1926	Apparent Consumption 1925-1926	Production in 1926	Imports 1926-1927	Apparent Consumption 1926-1927	Production in 1927
Austria	2 430	2 160	4 590	3 220	1 550	4 770	2 600	2 490	5 080	3 008
Belgium	230	420	650	290	390	680	260	150	710	280
Denmark	30	1 070	1 420	390	1 070	1 460	350	1 080	1 430	390
Egypt	160	180	340	270	160	430	240	190	440	d) 450
France	10	20	30	0	30	0	0	20	40	30
French Indochina	30	500	530	0	500	520	30	530	560	d) 30
Germany	20	120	140	30	130	160	20	130	150	20
Greece	7 650	1 130	8 780	8 990	70	9 710	6 310	1 690	8 000	7 740
Holland	1 440	5 670	7 110	1 440	1 750	6 400	1 390	880	7 270	b) 1 470
Italy	210	550	760	300	d) 150	750	300	d) 450	750	360
Japan	4 630	2 420	7 050	6 500	1 550	8 400	6 000	2 300	8 380	5 500
Latvia	40	50	90	60	40	100	50	50	100	60
Lithuania	10	10	10	10	140	190	20	160	180	20
Netherlands	130	720	850	130	70	880	150	750	900	140
Poland	880	440	1 320	1 580	c) 1 130	1 150	1 280	220	1 500	1 490
Sweden	190	290	480	360	170	30	340	170	310	310
Switzerland	a) 130	380	510	a) 140	430	570	a) 150	440	590	a) 160
Czechoslovakia	880	560	1 440	1 070	560	1 430	930	530	1 460	1 030
Yugoslavia	690	340	1 030	800	430	1 400	770	420	1 190	800
U.S.S.R.	930	250	1 180	990	330	1 320	1 010	220	1 230	1 210
TOTALS	21 040	17 420	38 460	26 680	10 000	41 680	22 220	18 230	40 450	24 880
Other countries		3 600			3 110	—		1 250	—	—

a) Inclusive of split and meslin — b) Partly estimated — c) Export — d) Estimate

and that 1) The 1927 figures for production are still provisional for many countries, and that owing to bad weather in many wheat growing centres during harvesting, it is very likely that some of the definite figures will be below the provisional estimates at present available 2) The percentage of wheat unfit for bread making is higher than usual in some importing countries, owing to heavy rain which damaged crops in the final stages of growth and during harvesting 3) The relatively plentiful supply, may lead to a larger consumption For the foregoing reasons it is estimated that the countries marked in table II will import about 17 million metric tons The requirements of other importing countries must be added to this quantity, which on the basis of last season can be estimated at about 4 million metric tons In short, the total requirement of importing countries for the season 1927-28 will probably amount to 21 million metric tons

III. — CONCLUSION.

By taking into account the quantity available for export between 1st August 1927 and 31st July 1928 (estimated at about 26 million metric tons) and the probable requirements of importing countries (estimated at about 21 million metric tons) it appears that the available supplies of wheat are sufficient to cover consumption requirements until the next harvests in the Northern Hemisphere and assure a large carry over at the end of the present season.

The export surplus and the quantity actually exported during the three previous seasons (1st August-31 July) are given below for purposes of comparison.

	Thousand metric tons	
	Export Surplus	Quantity exported
1924-25	23,400	20,800
1925-26	20,500	18,400
1926-27	26,000	22,700
1927-28	26,000	(1) 21,000

Naturally the estimates for 1927-28 are merely approximate as the figures for production in the Northern Hemisphere are at present only provisional and no definite opinion can be given as to the probable results in the Southern Hemisphere. However it is not likely that the foregoing conclusions will suffer much change when the definite figures are known.

(1) Probable requirements of importing countries

International Trade. SURPLUS QUANTITY OF IMPORTS (+) OR OF EXPORTS (—)

Countries	Wheat		Wheat flour		Rye		Barley		Oats	
	(August 1-July 31)	1925-26	(August 1-July 31)	1925-26	(August 1-July 31)	1925-26	(August 1-July 31)	1925-26	(August 1-July 31)	1925-26
	metric tons		metric tons		metric tons		metric tons		metric tons	
Germany	+ 2,431,390	+ 1,939,205	+ 43,609	125,457	+ 486,459	+ 120,880	+ 2,103,105	+ 1,299,971	+ 163,925	+ 304,972
Austria	+ (6) 244,212	+ (6) 238,412	+ 1,323	—	+ 49,402	+ (1) 49,190	+ 255,466	+ (1) 270,883	+ 83,394	+ 158,078
Belgium	+ 1,483,512	+ 1,063,081	+ 5,704	13,461	+ 86,532	+ 49,190	+ 255,466	+ 270,883	+ 83,394	+ 158,078
Denmark	+ 110,275	+ 100,437	+ 61,430	44,037	+ 163,409	+ 213,434	+ 21,010	+ 11,288	+ 23,883	+ 1,068
Spain	+ 282	+ (2) 10,614	+ 13,154	9,721	—	3	+ 442	+ (2) 37,397	+ (2) 29,062	+ 9,890
Estonia	+ 14,906	+ 16,722	+ 6,698	6,781	+ 43,024	+ 54,878	+ 1,078	+ 765	+ 4,969	+ 2,383
Finland	+ 337	+ 779,260	+ 98,602	99,154	+ 123,216	+ 169,872	+ 371	+ 35,684	+ 49,027	+ 191,498
France	+ 1,688,463	+ 4,885,068	+ 1,450	220,707	+ 103,612	+ 18,370	+ 29,980	+ 798,073	+ 249,602	+ 471,514
Gr. Brit. and North. Ireland	+ 5,991,821	+ 307,601	+ 141,134	161,577	—	15,414	+ 50,994	+ 49,430	+ 34,570	+ 66,287
Hungary	+ 393,850	+ 307,601	+ 141,134	161,577	—	15,414	+ 50,994	+ 49,430	+ 34,570	+ 66,287
Italy	+ 2,840,245	+ 1,800,211	+ 1,638	20,675	—	12,761	+ 10,690	+ 15,031	+ 10,690	+ 15,031
Latvia	+ 46,546	+ 41,933	—	23	+ 55,228	+ 63,307	+ 3,837	+ 3,837	+ 1,040	+ 7,061
Lithuania	+ 186	+ 2,383	—	—	+ 2,674	+ 1,090	+ 3,957	+ 1,178	+ 470	+ 564
Norway	+ 91,683	+ 84,083	+ 54,283	68,557	+ 172,074	+ 201,842	+ 24,882	+ 34,885	+ 9,758	+ 20,630
Netherlands	+ 350,977	+ 578,796	+ 145,640	112,784	+ 83,912	+ 149,707	+ 281,882	+ 318,211	+ 94,240	+ 106,188
Poland	+ 210,025	+ 190,713	+ 6,703	3,787	+ 42,383	+ 320,507	+ 90,273	+ 168,430	+ 36,007	+ 98,467
Rumania	+ 180,069	+ 162,216	+ 81,835	75,491	+ 38,181	+ 3,041	+ 717,865	+ 274,677	+ 93,281	+ 26,110
Kingdom of the Ser., Cr. and Slov.	+ 125,042	+ 157,495	+ 27,649	40,531	+ 12,801	+ 6,296	+ 34,829	+ 23,600	+ 13,184	+ 16,615
Slovakia	+ 431,080	+ 423,178	+ 6,881	1,322	—	—	+ 35,914	+ 13,371	+ 11,114	+ 29,376
Switzerland	+ 431,080	+ 423,178	+ 6,881	1,322	—	—	+ 35,914	+ 13,371	+ 11,114	+ 29,376
Czechoslovakia	+ 431,080	+ 423,178	+ 6,881	1,322	—	—	+ 35,914	+ 13,371	+ 11,114	+ 29,376
U. S. S. R.	+ 1,320,731	+ 737,100	+ 150,213	280,126	+ 412,630	+ 172,869	+ 109,491	+ 804,300	+ 58,250	+ 21,300
Canada	+ 6,344,602	+ 7,492,825	+ 815,881	964,826	—	158,007	+ 844,017	+ 743,964	+ 70,039	+ 481,390
United States	+ 3,686,957	+ 1,968,269	+ 1,196,492	849,154	—	277,027	+ 391,598	+ 579,725	+ 129,944	+ 404,884
Argentina	+ 3,630,351	+ 2,340,650	+ 153,783	146,508	+ 144,759	+ 53,424	+ 316,270	+ 147,090	+ 562,609	+ 541,783
Chile	+ 8,326	+ 21,860	+ 1,368	3,261	—	—	+ 100,762	+ 75,775	+ 78,915	+ 66,385
Ceylon	—	71	—	17,436	—	—	+ 272	+ 296	+ 984	+ 836
India	+ 220,801	+ 131,601	+ 63,416	60,630	—	—	+ 18,280	+ 7,210	+ 724	+ 761
Indochina	—	—	+ 22,937	21,093	—	—	—	—	—	—
Japan	+ 492,065	+ 746,219	+ 52,571	90,307	—	—	+ 300	+ 904	+ 1,753	+ 2,227
Syria and Lebanon	+ 20,580	+ 31,252	+ 20,147	34,941	—	—	+ 3,808	+ 9,798	—	—
Algeria	+ 30,177	+ 194,095	+ 3,178	444	—	—	—	—	—	—
Egypt	+ 49,462	+ 38,623	+ 163,749	216,430	—	—	+ 47,021	+ 71,946	+ 22,571	+ 34,813
Tunisia	+ 5,088	+ 72,083	+ 2,004	9,094	—	—	+ 10,465	+ 8,787	+ 12,410	+ 22,568
Union of South Africa	+ (3) 73,166	+ (3) 114,206	+ (3) 20,687	+ (3) 26,231	—	—	+ (3) 8	+ (3) 9	+ (3) 783	+ (3) 1,727
Australia	+ 2,119,432	+ 1,467,399	+ 459,709	445,223	—	—	+ 47,452	+ 16,848	+ 3,357	+ 3,685
New Zealand	+ 37,125	+ 59,462	+ 26,846	10,762	—	—	+ 397	+ 1,744	+ 2,398	+ 3,322
Total of imports	+ 16,164,723	+ 13,153,156	+ 1,534,647	1,567,989	+ 1,577,763	+ 1,220,770	+ 3,569,057	+ 2,940,087	+ 1,107,911	+ 1,691,538
Total of exports	— 18,660,211	— 14,862,587	— 3,032,831	— 2,914,811	— 1,584,760	— 1,276,546	— 3,216,448	— 3,135,908	— 1,172,163	— 1,799,492

(1) July-June. — (2) Eight months. — (3) Eleven months.

SURPLUS QUANTITY OF IMPORTS (+) OR OF EXPORTS (—)

Countries	Maize		Linsseed		Rice		Tea		Coffee	
	(November 1-July 31)	metric tons	(January 1-July 31)	metric tons	(January 1-July 31)	metric tons	(July)	metric tons	(July)	metric tons
	1946-47	1945-46	1947	1946	1947	1946	1947	1946	1947	1946
Germany	+ 1,417,900	- 382,124	- 240,167	- 182,267	+ 121,965	- 96,654	+ 764	+ 820	+ 19,498	+ 16,876
Austria	+ (t) 153,031	- (t) 125,061	- 81	- (2)	13,061	- (2)	11,897	..	..	..
Belgium	- 57,873	- 446,123	- 30,236	- 50,272	- 27,190	- 21,434	- 22	+ 12	+ 3,241	+ 2,887
Denmark	- 614,011	- 317,885	- 4,973	- 17,855	- 3,198	- 3,097	- 32	+ 50	+ 2,232	+ 2,533
Spain	- (3) 112,539	- (3) 209,554	- 0	- 3,972	- 15,935	- (4)	21,616	..	..	..
Sweden	- 1,861	- 289	- 650	- 937	- 967	- 1,250	..	..	..	..
France	- 564,731	- 418,201	- 8,470	- 28,701	- 77,714	- 164,981	+ 8	+ 10	+ 1,236	+ 1,143
Gr. Brit. and North. Ireland	- 1,344,246	- 1,103,394	- 259,315	- 280,635	+ 76,631	- 61,555	+ 80	+ 121	+ 10,986	+ 12,029
Hungary	- 42,453	- 188,488	- 1,952	- 1,904	- 13,617	- 13,415	+ 13	+ 12	+ 1,667	+ 1,550
Italy	- 257,827	- 228,608	- 314	- 578	- 1,462	- 1,252	- 662	+ 12	+ 290	+ 285
Free State	- 280,237	- 334,125	- 42,519	- 35,031	- 116,795	- 93,730	- 6	+ 16	+ 3,790	+ 3,546
Latvia	- 102	- 151	- 596	- 647	- 1,251	- 1,328	- 8	+ 8	+ 14	+ 12
Lithuania	- 100,062	- 54,042	- 7,889	- 4,376	- 1,317	- 1,062	- 8	+ 8	+ 14	+ 12
Norway	- 100,062	- 54,042	- 7,889	- 4,376	- 1,317	- 1,062	- 8	+ 8	+ 14	+ 12
Netherlands	- 140,053	- 78,078	- 20,718	- 27,393	- 88,519	- 67,490	- 12	+ 12	+ 1,739	+ 1,145
Poland	- 1,569,984	- 1,531,370	- 9,401	- 3,706	- 41,105	- 10,428	- 107	+ 137	+ 3,271	+ 1,853
Rumania	- 1,569,984	- 1,531,370	- 9,401	- 3,706	- 41,105	- 10,428	- 107	+ 137	+ 3,271	+ 1,853
Kingdom of the Ser., Cr. and Slov.	- 103,521	- 80,447	- 2,907	- 3,194	- 12,137	- 11,294	- 0	+ 0	+ 3,198	+ 7,108
Sweden	- 85,074	- 97,774	- 26,490	- 23,381	- 9,997	- 9,377	- 24	+ 19	+ 50	+ 1,205
Switzerland	- 286,305	- 291,746	- 13,095	- 9,798	- 31,144	- 31,059	- 28	+ 24	+ 729	+ 619
Czechoslovakia	- (5) 100,396	- (5) 25,328	- 13,095	- 9,798	- 31,144	- 31,059	- 28	+ 24	+ 729	+ 619
U. S. S. R.	- 390,715	- 304,714	- 97,795	- 5,011	- 11,393	- 18,463	- 1348	+ 1,220	+ 698	+ 282
Canada	- 316,740	- 517,009	- 373,488	- 340,716	- 90,204	- 28,008	- 2,747	+ 4,016	+ 40,685	+ 51,847
United States	- 5,892,596	- 2,756,409	- 1,180,237	- 1,185,235	- 11,049	- 11,533	- 190	+ 166	+ 399	+ 370
Argentina	- 47	- 122	- 110,710	- 59,539	- 283,533	- 298,473	- 9,147	+ 9,194	+ 119	+ 120
Brazil	- 92,335	- 43,822	- 30,236	- 50,272	- 1,661,738	- 1,365,265	- 14,291	+ 14,291	+ 115	+ 115
India	- 30,435	- 31,455	- 30,435	- 31,455	- 1,049,785	- 907,810	- 4,253	+ 4,253	+ 3,061	+ 2,216
Indochina	- 20,632	- 16,127	- 4,528	- 4,773	- 471,111	- 204,523	- 1,430	+ 1,911	+ 83	+ 87
Syria and Lebanon	- 1,843	- 1,484	- 4,528	- 4,773	- 471,111	- 204,523	- 1,430	+ 1,911	+ 83	+ 87
Algeria	- 10,915	- 1,113	- 24	- 49	- 4,387	- 2,517	- 58	+ 46	+ 782	+ 383
Egypt	- 5,014	- 9,046	- 39	- 79	- 6,065	- 28,191	- 300	+ 300	+ 222	+ 829
Tunisi	- 10,377	- 4,149	- 482	- 454	- 728	- 523	- 107	+ 126	+ 102	+ 43
Union of South Africa	- 16,108	- (6) 369,574	- 1,484	- 4,773	- 471,111	- 204,523	- 1,430	+ 1,911	+ 83	+ 87
Australia	- 15,928	- 41,881	- 10,933	- 15,173	- 17,113	- 6,383	- 2,014	+ 1,889	+ 104	+ 88
New Zealand	- 2,827	- 4,761	- 270	- 766	- 2,839	- 2,002	- 588	+ 382	+ 42	+ 19
Total of imports	+ 7,359,301	+ 3,272,900	+ 1,322,255	+ 1,257,731	+ 1,400,028	+ 1,370,975	- 25,773	+ 26,087	+ 103,332	+ 107,902
Total of exports	- 8,346,993	- 3,361,826	- 1,320,120	- 1,286,613	- 2,931,500	- 2,953,488	- 29,670	- 29,282	- 103,332	- 107,902

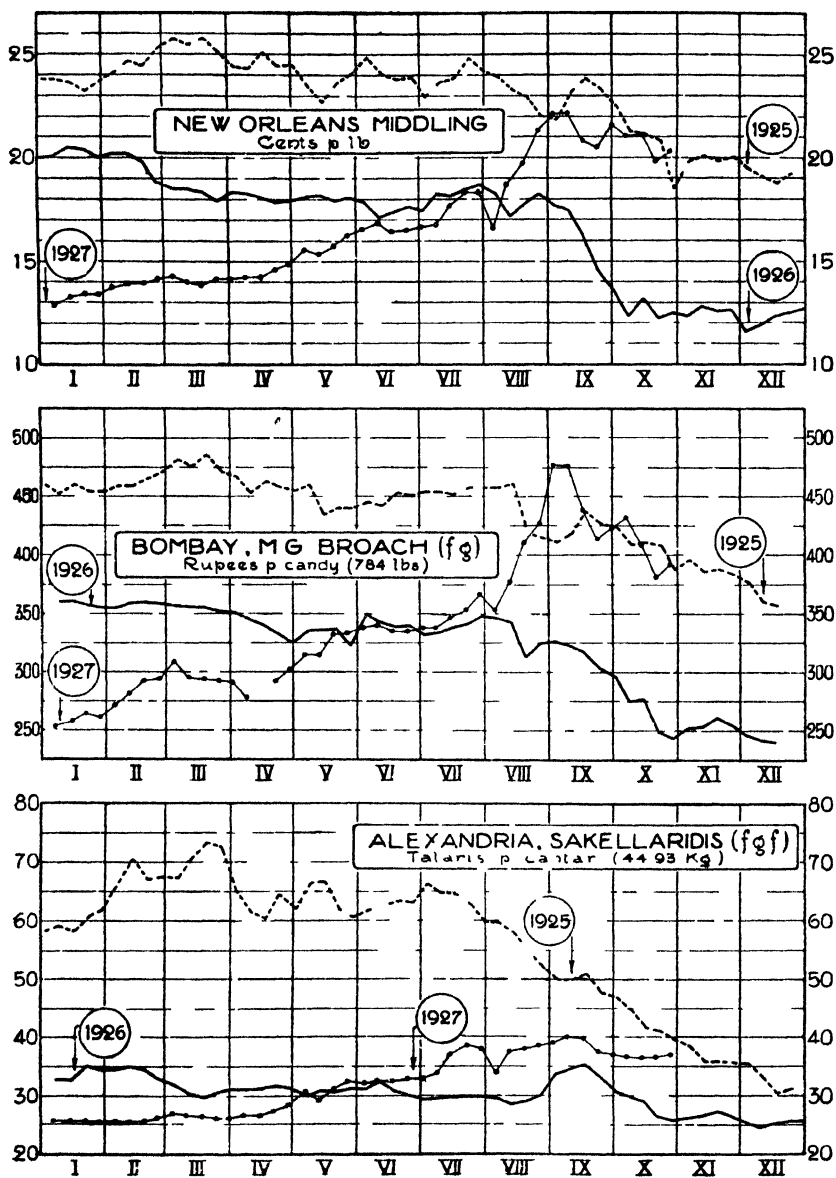
(1) October-June — (2) Six months — (3) Five months — (4) Three months — (5) Four months — (6) Eight months

SURPLUS QUANTITY OF IMPORTS (—) OR OF EXPORTS (—)

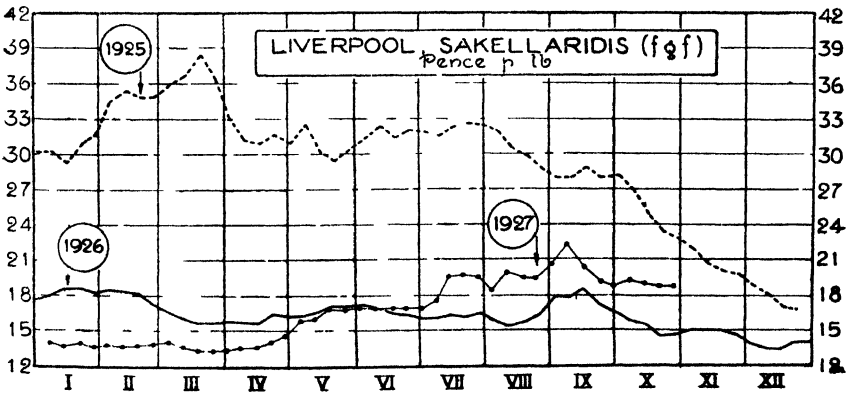
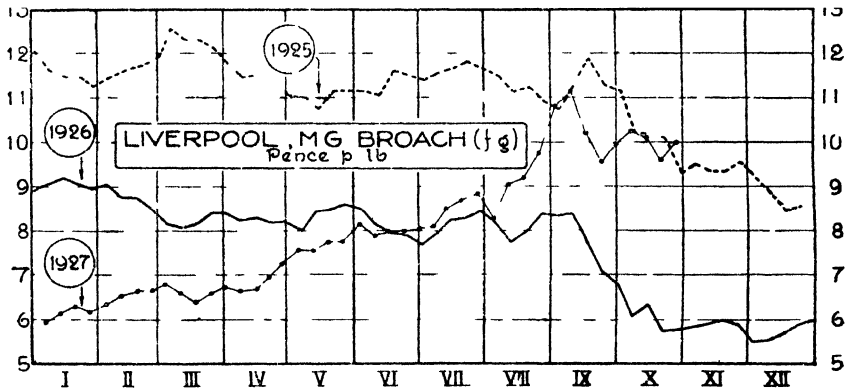
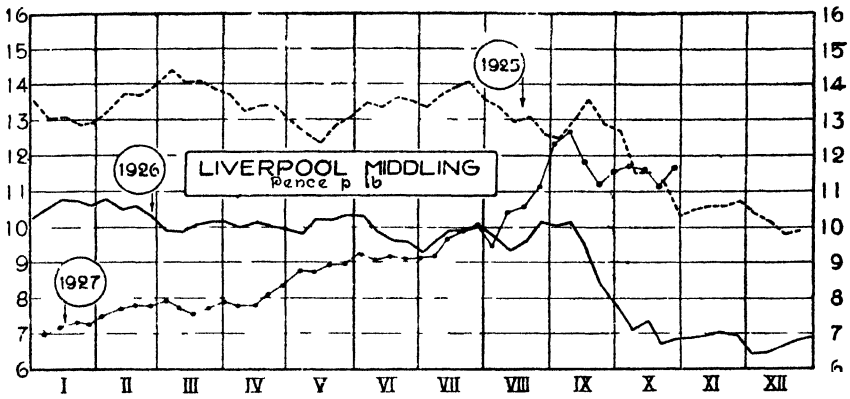
Countries	Butter		Cheese		Cotton		Wood	
	(July 1927)	1926	(January 1927)	1926	(August 1927)	1926-27	(September 1927)	1926-27
	metric tons		metric tons		metric tons		metric tons	
Germany	58,507 +	53,445 +	38,277 +	31,011 +	452,477 +	178,018 +	124,145 +	
Austria	1,148 + (t)	834 + (t)	1,666 + (t)	1,804 + (t)	30,531 + (t)	6,122 + (t)	5,200 +	
Belgium	90 +	1,495 +	8,503 +	8,186 +	80,395 +	60,281 +	30,706 +	
Denmark	84,472 +	79,372 +	2,577 +	3,731 +	5,925 +	909 +	783 +	
Spain	(4)	33 + (4)	608 + (4)	513 + (5)	29,820 + (5)	983 + (6)	3,483 +	
Estonia	4,867 +	4,556 +	1 +	2 +	5,168 +	4,502 +	218 +	
Finland	10,800 +	9,243 +	1,931 +	1,459 +	8,906 +	8,776 +	1,274 +	
France	3,337 +	2,520 +	4,903 +	1,234 +	331,727 +	285,541 +	287,248 +	
Greece	176,829 +	173,829 +	89,536 +	90,840 +	786,218 +	190,804 +	193,703 +	
Hungary	167 +	167 +	168 +	61 +	744,475 +	3,909 +	5,664 +	
Ireland	11,723 +	8,799 +	1,729 +	633 +	6,228 +	3,937 +	3,937 +	
Irish Free State	1,381 +	1,381 +	13,600 +	15,241 +	223,216 +	34,566 +	43,152 +	
Italy	5,786 +	6,040 +	311 +	1,173 +	1,942 +	460 +	472 +	
Lithuania	1,088 +	948 +	311 +	314 +	1,942 +	460 +	472 +	
Norway	333 +	211 +	161 +	90 +	2,326 +	2,218 +	30 +	
Netherlands	25,311 +	25,311 +	53,506 +	44,502 +	40,334 +	33,572 +	3,147 +	
Poland	3,904 +	2,541 +	680 +	829 +	70,980 +	46,456 +	16,611 +	
Rumania	81 +	56 +	513 +	101 +	714 +	846 +	46 +	
Kingdom of the Serbs, Croats and Slovenes	117 +	42 +	898 +	512 +	7,479 +	6,613 +	3,725 +	
Switzerland	11,501 +	9,143 +	331 +	297 +	25,372 +	21,945 +	6,634 +	
Czechoslovakia	4,501 +	4,855 +	20,087 +	12,651 +	2,171 +	29,868 +	8,222 +	
U. S. S. R.	17,698 +	16,892 +	1,533 +	1,679 +	130,215 +	120,562 +	13,847 +	
Canada	3,010 +	2,025 +	13,051 +	17,750 +	66,531 +	61,918 +	3,847 +	
United States	1,855 +	39 +	19,869 +	14,113 +	2,540,974 +	1,828,531 +	109,925 +	
Argentina	12,885 +	15,178 +	416 +	186 + (t)	14,048 + (t)	9,471 +	150,112 +	
Chile	—	—	—	—	—	—	11,616 +	
Ceylon	134 +	157 +	49 +	39 +	746 +	1,003 +	—	
India	96 +	109 +	296 +	236 +	447,836 +	639,127 +	24,234 +	
Japan	173 +	218 +	21 +	34 +	694,568 +	660,040 +	38,314 +	
Syria and Lebanon	791 +	509 +	48 +	24 +	106 +	637 +	2,679 +	
Algeria	519 +	430 +	1,642 +	1,015 +	912 +	918 +	3,996 +	
Egypt	600 +	747 +	1,552 +	1,063 +	347,314 +	316,304 +	1,968 +	
Tunis	173 +	129 +	322 +	257 +	—	—	178 +	
Union of South Africa	(t)	46 + (t)	1 + (t)	68 + (t)	2,240 + (t)	3,329 + (t)	105,502 + (t)	
Australia	16,313 +	20,937 +	687 +	1,181 +	949 +	1,078 +	845,363 +	
New Zealand	49,159 +	35,484 +	56,713 +	53,110 +	—	—	97,987 +	
Total of imports	252,154 +	243,970 +	162,563 +	152,678 +	3,051,530 +	2,768,769 +	942,783 +	
Total of exports	255,069 +	238,096 +	106,646 +	153,210 +	3,853,333 +	2,819,395 +	753,420 +	

(t) Six months. — (a) July-June. — (3) October-June. — (4) Three months. — (5) Eight months. — (6) Seven months. — (7) Ten months. — (8) Eleven months.

Prices of Cotton.



Prices of Cotton.



AGRICULTURAL LEGISLATION

I. — TRADE IN AGRICULTURAL PRODUCTS, FERTILIZERS AND LIVESTOCK.

Finland. — A Law of 1 July 1927 (*Finlands Förfatningssamling*, No 183-191, 7 July 1927) deals with the control of butter and cheese exports and imports. Butter and cheese exports and imports are placed under the control of the "State Butter Control Institute", and the customs and police authorities are required to apply the provisions of the law. Only butter and cheese of national origin may be exported and these goods must be supplied with the stamp of this Institute to show that they have been declared suitable for exportation. The present law also contains provisions with respect to the qualities required in the case of cheese and butter intended for export. Cheese intended for industrial use as raw material must be supplied with a special mark, and butters intended for import and export, salted or unsalted, must not contain any preservative. Persons wishing to export and import these goods are required to notify the "State Butter Control Institute". The Council of State may allow the exportation free of customs dues, of cheese and butter, intended for Sweden, Norway and Russia, but as a provisional measure and for a determined period, according to the conditions specially laid down by the Council itself. The present Law further contains precise regulations with respect to the powers of the manager of the "State Butter Control Institute" or his delegate, with respect to right of access to the warehouses and the keeping of registers and correspondence.

Regency of Tunis. A Decree of 26 August 1927 (*Journal Officiel Tunisie*, No 76 of 21 September 1927) removes the embargo on exportation of fresh meat, ham, malt, dry vegetables, potatoes, fodder crops and straw as well as on wines derived directly from the fermentation of fresh grapes.

* * * Another Decree, also of 26 August (*Journal Officiel Tunisie*, *idem*) repeals certain exportation dues which in virtue of the Decrees of 19 April, 12 June and 7 October 1924, 7 July and 9 October 1925, 27 May and 23 September 1926, 7 February, 5 April and 20 May 1927, were payable in respect of certain animals and products e. g., horses intended for slaughter, poultry and live pigeons and rabbits and salt meat, as well as eggs, natural and concentrated milk, cheeses, fresh vegetables and butter.

Canada. — Regulations No. 14 (*etranger*) of 20 April 1927 (*The Canada Gazette*, No. 46 [14 May 1927]) prohibits the importation into certain parts of

Canada of fresh peaches, nursery products, etc. coming from certain States of the American Republic.

II. — FINANCIAL AND CUSTOMS LEGISLATION.

Italy — A Royal Decree of 12 August 1927, No. 1763 (*Gazzetta Ufficiale* of 29 September 1927) approves the Regulations for the application of the Decree-Law of 16 January 1927, instituting a special duty on goats. It includes among others, a provision, that one tax only will be collected in the course of a single year. The Regulations further provide for the case of the transfer of livestock from one municipality to another and lays down principles for the distribution of the profits of the tax.

III. — PLANT PRODUCTION. INDUSTRY IN PLANT PRODUCTS.

Italy — A Decree-Law of 12 August 1927, No. 1754 (*Gazzetta Ufficiale*, 30 September 1927, No. 226) contains measures for the development of olive cultivation. In the areas where the olive is extensively cultivated it is laid down that *consorti* of olive growers may be set up for ensuring the development of olive growing, the reestablishment of old or disease affected plantations, and the adoption of effective control measures against the diseases and parasites of the olive. These societies may be inter-communal and provincial and have the right to form federations for the better realization of their objects. The constitution of a *consorzio* may be made compulsory by the Prefect if the Provincial Council of Economy is in agreement when olive growing is of special importance in the province.

IV. — AGRARIAN ORGANIZATION AND AGRICULTURAL INSTRUCTION

Finland — A Law of 1 July 1927 (*Finlands Förslutningssamling*, No. 183-191, 7 July 1927) deals with institutions for agricultural instruction. According to the provisions of this Law are considered as institutions for agricultural instruction schools of agriculture and rural economy, schools for small farmers, rural and consultation centres for small holders, schools for stock breeders, dairy, cheese-making, horse-breeding and farriery schools, and all institutions engaged on work of this order. The agricultural schools may be State or private establishments, or associations of a private character. Private agricultural schools in receipt of a State subsidy, are under the supervision of the public authorities. The State may take over the direction of the State agricultural schools and may also give financial assistance to private associations insofar as this is necessary. All private agricultural schools founded otherwise than as prescribed in the present law, shall also receive a State subsidy on condition that it can prove that local conditions have rendered its foundation necessary, and that the particular institution should adopt a syllabus of study approved by the competent authority; that the teachers possess the necessary qualifications, and that the institutions are generally carried according to the principles laid down. The Council of State may take steps for the suppression of any agricultural school, where necessary.

V. — PLANT DISEASES. ANIMALS AND PLANT PESTS.

Germany. — A Decree of 22 August 1927 (*Reichsgesetzblatt*, Teil I, Nr. 41, 16 September 1927) contains provisions, issued in virtue of the Decree of 29 January 1919, respecting the control of weeds and animal pests, by the use of highly poisonous substances. The Decree prohibits absolutely the use of hydrocyanic acid and of any substance, composition or preparation which may be used for giving off hydrocyanic acid, or volatile compositions of this acid. The Minister of Agriculture and Supplies, in agreement with the Minister of Internal Affairs, may grant exemptions in the case of certain determined acids. The above provisions do not however apply to the administration of the army or navy or to the scientific research institutes belonging to the Reich or the States.

Egypt. — An Order of 10 August 1927 (*Journal Officiel du Gouvernement Egyptien*, No 69, 15 August 1927) fixes the dates prior to which for the year 1927, the destruction of the boll worm and the cotton seed worm must be effected. According to the provisions of the present Decree and prior to the dates fixed separately for each region, the uprooting beneath the level of the soil of the roots of the cotton plant, of til (*Hibiscus cannabinus*) and of baima (*Hibiscus esculentus*) shall be systematically carried out, so that it will be impossible for them to sprout afresh. All capsules containing seeds which have fallen on the ground during these operations must be collected and burnt.

France. — A Decree of 30 September 1927 (*Journal Officiel*, No 233, of 7 October 1927) sets out the new organization and working of the plant protection and the phytopathological services. The present phytopathological inspection service set up by the Ministry of Agriculture and regulated by the Decree of 24 November 1923 is transformed into a Plant Protection Service. This new Plant Protection Service shall be responsible for the sanitary control of growing plants and the organization of protection against diseases and organisms harmful to plants and plant products, phyto-sanitary control of imports and exports, the control of farms from which exported products are obtained and the granting of phyto-sanitary certificates. This Service has at its disposal, for carrying out its functions, the officials of the external services of the Department of Agriculture and the help of the agricultural offices. It works in collaboration with the Institute of Agronomic Research, and more particularly with the stations and laboratories of entomology, phytopathology and biology. The Decree lays down also that the Minister of Agriculture shall fix by Order the limits of the phyto-sanitary areas, each of which shall have the assistance of an agricultural entomology station and a plant pathology station or similar establishments constituting the scientific centre for the area. The same Decree contains provisions with respect to the control of plants and parts of plants for the purpose of the granting of phyto-sanitary certificates. All plants or parts of plants intended for export, in respect of which a phyto-sanitary certificate is required must be accompanied by a "certificate of healthy origin" to be presented to the officers of the plant protection service when the goods are subject to their control. The "certificate of healthy

origin" and the "phytosanitary certificate" may only be issued in respect of products derived from crops regularly submitted to State phyto-sanitary control.

Every farmer wishing to subject his crops or products to State phytosanitary control must, in order to obtain "certificates of healthy origin" or "phytosanitary certificates" make written application on stamped form between 1 November and 31 December in each year. Each person subjected to such State control must pay an annual subscription of 50 francs, or may pay 100 francs for permanent registration. The State does not assume any liability as regards any consequences that might accrue, either as regards exporters or third parties, as the result of the organization and working of phytosanitary control, or of the acceptance or refusal, on the part of foreign authorities, of the certificates issued by the Plant Protection Service.

Mauritius. — A Proclamation No. 26 of 15 June 1927 with respect to the presence of a certain disease provisionally identified as a form of *Trichosporium*, attacking the roots of the *Casuarina Iquisetifolia* orders that all persons who own or possess lands where the presence of this disease is or may be reported must carry out all orders for the suppression of the disease and, if necessary, fell the trees affected.

VI. — CO-OPERATION, INSURANCE AND AGRICULTURAL CREDIT.

Egypt. A Law of 22 July 1927, No. 23 (*Journal Officiel du Gouvernement Egyptien*, No. 78, 15 September 1927) repeals law No. 27 of 1923 and establishes a new administrative and juridical organization for the Egyptian co-operative societies. The object of these societies is to improve the position of the members in the matter of production, purchase, sale, credit, insurance, etc., by collaboration and by adopting the principles of co-operation. A co-operative society may adopt one or more of the above mentioned objects. The co-operative society is composed of a variable number of members; this number may not however be inferior to ten. The capital may be represented either by subscriptions, deposits or shares. These societies are divided into two categories, viz., societies with limited and societies with unlimited liability respectively. The Minister of Agriculture acts as President of the Higher Council of Co-operative Societies, which is responsible for considering the general lines of policy regarding the co-operative movement and to study the means for obtaining the necessary financial support.

The value of the shares which the society is authorized to issue, may not be more or less than the nominal value of the original shares and the value of these shares shall be indicated in the statutes.

As regards borrowing and loans the co-operative societies are required to conform with the rules prescribed. The administration of the societies is entrusted in part to the Council of Administration for general purposes and to a Supervising Committee, responsible for the regular functioning of the societies. The societies shall in addition be subject to inspection by the "Co-operative Societies Service" of the Ministry of Agriculture, which shall examine the minutes of the administrative committee and the decisions of the general

assembly. The co-operative societies may form associations amongst themselves in order to establish central co-operative societies having the same object as the affiliated societies, with a view to carrying out on a large scale the operations carried out by each society on its own account.

The Law also provides for the formation of Unions of co-operative societies, for the formal duties of checking the operations and auditing the accounts, duties which for the time being are assumed by the Co-operative Societies Service of the Ministry of Agriculture and also for directing the affiliated societies and assisting the people to form co-operative societies by instructing them as to methods of organization and diffusing among them the co-operative spirit

France (Indochina) An Order of 21 July 1927 (*Journal officiel de l'Indochine française*, No 60, 27 July 1927) prescribed rules for the organization and the working of popular agricultural credit in Indochina through the intermediary of provincial banks. These banks in order to benefit by the privileges granted by the Institute of Popular Agricultural Credit must see that their statutes conform to the provisions of the present Order. One bank only can be recognized in each province but this bank may have branches and set up loan committees, on the recommendation of its administrative committee, approved by the chief of the province. These banks when duly recognised may, but exclusively for the benefit of their members, grant loans to agriculturists, associations and communes for the purchase of land for cultivation, seeds or plants, fertilizers, insecticides, livestock, tools as well as agricultural implements and machines. They have power in addition to cover the cost of crop cultivation, harvesting and the transformation of agricultural products, establish or repair irrigation or drainage works, and also to acquire them for account of their members. They may also contract loans and constitute reserve funds with the profits obtained through their operations. The provincial banks may be responsible for the distribution of funds used for the reparation of damage caused by natural accidents such as floods, typhoons or epizootic diseases. They may hold public or private sales on property on which they have a mortgage or other ownership charge. The Order also contains precise regulations regarding the administration and working of provincial banks, communal loans committees, the powers of the general assemblies of the banks as well as the staff of popular agricultural credit.

Italy A Decree-Law of 20 July 1927, No 1509 (*Gazzetta Ufficiale*, 26 August 1927, No 197) contains provisions respecting the organization of agricultural credit in the Kingdom. Credit operations are divided into the following categories: operations connected with working capital and operations for improvements. To the first category belong the following: - (1) loans for ordinary farming purposes and for the utilization, manipulation and transformation of products; (2) loans for the purchase of livestock, agricultural instruments and machines, (3) advances on the pledge of agricultural products deposited in public or private warehouses, (4) loans in favour of agricultural institutions and associations: (a) for goods required for the adminis-

tration of members farms; (b) advances to members in connection with the utilization, transformation and collective sale of their products. To the second category belong loans granted for the following purposes: (a) setting up plantations and effecting changes in crops, (b) construction or accommodation roads to farms; (c) land management, (d) construction of wells and boundaries; (e) construction of rural buildings; (f) construction of drainage and irrigation works; (g) application of electricity to agriculture, etc

Loans for working capital shall be due for repayment at harvest time or on the conclusion of the utilization or transformation of the product, the improvement loans being repayable by annual instalments not exceeding five in number. The loans shall be granted in return for agricultural bills of exchange; improvement loan in return for a mortgage or other similar security.

AGRICULTURAL ASSOCIATIONS

GENERAL NOTICES

Finland. THE CONFEDERATION OF THE AGRICULTURAL ASSOCIATIONS OF FINLAND. — The agricultural organisations at present actively engaged in Finland are the following :—

1. Suomen Maataloussereuojen Keskusliitto (*Confederation of the Agricultural Associations of Finland*),
2. Suomen ruotsinkielisten maanviljelysseurejen Liitto (*Federation of the Swedish-speaking Agricultural Associations*);
3. Pienviljelijäin Keskusliitto (*Confederation of Small Farm Holders*);
4. Pienviljelijäin Liitto (*Association of Small Farm Holders*)
5. Meetalouselijäin Keskusliitto (*Confederation of Growers*)

The three first named bodies are of a purely agricultural and technical character, the objects of the fourth include the technical and the political aspects of agriculture, the fifth deals solely with general agricultural policy.

There are 22 agricultural associations in existence in Finland, of these the 19 using the Finnish language are grouped under the Confederation of Agricultural Associations, which is the most important of the organisations cited in the above list. The three remaining Swedish-speaking associations are grouped in their own special federation

The agricultural associations, of which the Confederation is composed, include in their turn the local Farmers' Clubs which numbered at the end of last year 1,130, of which 1,020 used the Finnish language. These local clubs are formed of individual farmers, but membership is open to other persons interested in agricultural questions, relatives of farmers, and farm hands

Up to the end of last year there were 70,800 club members, the majority being holders of small or medium sized farms

To the Confederation are also attached 15 specialised technical associations, among which may be mentioned various associations for stock improvement in general, the forestry association, and the associations for irrigation works, for the reclamation of marshlands, and for pastureland.

The membership of the technical associations is 15,000.

The general meeting of each local club proceeds to the appointment of its own chairman and delegates, who have the duty of representing the club itself in the agricultural associations. In the associations these representatives elect in their turn the President of the Association and the Delegates to the general meeting of the Confederation on which the technical associations are also represented.

The Delegates of the *Confederation* usually meet every two years and appoint the President and Council of the Confederation.

There is a close bond of union between the agricultural and the technical associations, and whereas the latter deal especially with specialised technical questions, the former deal with all problems relating to agriculture in respect of which they act as advisory bodies.

The active work of the associations consists also in making proposals intended to secure increased and improved agricultural production, by the institution of courses of instruction, exhibitions, lectures, etc., the foundation of consortia for the purchase of agricultural machinery, etc.

Both the agricultural and the technical associations are in receipt of an annual government grant, and in their turn provide funds for the Confederation.

The Confederation of the Agricultural Associations of Finland, founded in 1898, represents the associations officially, supplies all the reports required by the Government and other authorities, supervises the work of the general meetings of the local clubs and the associations, controls the employment of their funds, arranges the publication of propaganda and statistical leaflets, — in brief exercises a general control over local clubs and associations, and lays down the general lines of the work of improving and extending the national agriculture

Norway. - DET KGL SEBSKAP FOR NORGES VEL, OSLO. (Royal Society for the Welfare of Norway, Oslo) — This society was founded in 1909, the object being the promotion of agriculture and the ancillary industries. It groups the agricultural associations of the various provinces of the Kingdom and carries on work by means of five committees, as follows :—

The *Pasturage Committee* which deals with the utilisation of mountain pastures as well as with the formation and use of pasturelands in the neighbourhood of farms ; the *Plant Cultivation Committee* superintends the various crops ; the *Committee on Co-operation* the work of which is to introduce and diffuse the co-operative system in the different branches of agriculture ; the *Farm Accountancy Committee* which makes enquiries into the economic conditions of agriculture in the different regions and organises courses in farm accountancy for farmers ; the *Technical Committee*, which deals with questions of farming technique.

In addition the programme of the Society includes a series of measures designed to encourage horticulture and the ancillary industries.

CURRENT NOTICES

AGRICULTURAL INSTRUCTION AND EXPERIMENT

An International Organization for the Study of Peat Soils. — The VIth Commission of the International Society of Soil Science has appointed a Sub-Commission for the purpose of promoting, co-ordinating and developing on an international basis the study of peat-fields, carrying on its work in harmony with any suggestions made by Governments or private enterprises. The final practical object of these researches is the better utilization and exploitation of the resources furnished by peat soils.

The work of organization has been entrusted to a Committee consisting of Dr A P DACHNOWSKI, of the United States Department of Agriculture, President; Dr H OSVALD, director of the Peat Experimental Station of Jonkoping, Sweden, Secretary; Dr B TACKE (Germany); Colonel J GIRSBERGER (Switzerland); Prof H MCCRORY (Washington, D C) and Drs: L Von POST (Sweden), I ALVAY (Minnesota, U S A), W S DOKTUROWSKI (U S S R) and A KIRF SANOV (U S S R). A special International Committee will cooperate in the researches, consisting of prominent authorities in palaeobotany, stratigraphy, the geographical distribution of peat-fields, sylviculture, agronomy, engineering and other special branches concerned with the peat-industry.

At the International Congress of Soil Science, recently held in Washington (13-22 June 1927), a special meeting was entirely devoted to the peat question, and as a result of the recognition of the advantages which may be derived from joint international action in both the theoretic and the practical fields, the Congress resolved in its last meeting to recommend, inter alia, the adoption of uniform methods in the investigation and exploitation of peat soils, so as accurately to examine the agricultural and industrial possibilities of peat resources throughout the world.

All persons interested in the question and wishing to collaborate with the international sub-commission, are invited to become members. All communications should be addressed to Dr. A P DACHNOWSKI (U S Department of Agriculture, Washington, D C), (*Science*, New Series, Vol LXVI, No. 1699; July 22, 1927).

A Decision of the German Agricultural Teaching Institutes for Coordinating Agricultural Researches. — The Agricultural Institutes of the Higher Schools and of the German Universities of Berlin, Bonn, Breslau,

Giessen, Göttingen, Halle, Hohenheim, Jena, Kiel, Königsberg, Leipzig and Munich have combined for the systematic co-ordination of agrarian research in Germany ("Reichsarbeitsgemeinschaft der Pflanzenbauinstitute an deutschen Hochschulen"), in order to avoid unnecessary overlapping in their respective researches and to solve in the most rapid manner the important agricultural questions which are constantly arising. (*Mitteilungen der Deutschen Landwirtschafts-Gesellschaft*, Berlin, 1927, Jahr. XLII, Stück 25).

The Service of Agricultural Ecology in Portugal. — The methodical and regular organization of Agricultural Ecology in Portugal dates back to the year 1923. But as early as 1892 Prof. Felipe DE FIGUEREDO, of the Lisbon Agricultural College, had published a "*Plano Geral de Observações Meteorológico-Agrícolas*" in which the creation of a network of stations for the application of meteorology to agriculture was proposed. The data thus collected were to be controlled and co-ordinated under the direction of the Professor of Agricultural Physics at the Lisbon College. Prof. DE FIGUEREDO's scheme comprised, in addition to observations on pure meteorology, observations on agricultural botany (vegetative phases of the various kinds of plants; quantity and quality of the different yearly crops; times of the different agricultural operations; phytopathological data, whether due to parasites or to meteorological conditions).

It was not until the new general organization of agricultural teaching and instruction in 1912, that meteorological and phenological posts were set up in the agricultural stations and institutes. Eleven years later, in 1923, on the initiative of Prof. Azevedo GOMEZ, Minister of Agriculture, and of Signor SEIXOS DE CUNHA, Chief of the Physiographical Studies Section, the "*Estação Agrária Nacional*" was established as an Institute of Agricultural Research at Lisbon. This served as a central Institute for coordinating the work of nine specialized technical sections, which were in their turn connected with 42 official dependent establishments, scattered throughout the country.

In connection with its special directive function the "*Estação Agrária Nacional*" also acts as a Central Station of Agricultural Ecology, ranking as the first of the nine Technical Sections. This Section of Physiographical Studies includes in its Research Scheme:—

- (a) The study of the soil from the agricultural standpoint (soil science);
- (b) The study of climate from the agricultural standpoint (climatic studies);
- (c) The systematic study of the combined influence of soil and climate on plant evolution. (*From a communication presented by Sig. E. A. MENDES FRAZÃO, Chief of the 1st Section of the National Agronomic Station of Lisbon, to the XIIIth International Agricultural Congress*).

Agricultural Instruction in the Dominican Republic. — Recent legislative orders deal with the working of the secondary agricultural schools, which form annexes to the Agricultural Station of the Republic. The following is the programme of instruction which will be carried out: General and Applied Chemistry, Elementary Physics, Mineralogy and Meteorology, Botany, Agronomy, Agricultural Bookkeeping, Animal Husbandry, Veterinary Science.

Students taking the diploma after a period of practical experience lasting for a year will obtain the title of "skilled agronomist". (*Bulletin of the Pan-American Union*, August, 1927).

AGRICULTURAL AND SCIENTIFIC INSTITUTIONS AND ASSOCIATIONS.

Austro-Bavarian Horse Breeding Union. — A meeting was held on 11 and 12 August last of the chief horse breeders and horse breeding experts of Austria and Bavaria when it was decided to establish a general Horsebreeding Union ("Pferdezuchtverband") with head quarters at Salzburg. The Union's chief duty will be the proper keeping of the Stud book. It will also deal at an early date with the breeding of brood mares, since this practice is continually extending. (*Wiener Landwirtschaftliche Zeitung*, Wien, 10 Sept., 77 Jg., Nr. 37).

An International Social Scientific Centre at Brussels. — The "Union des Associations Internationales" has organized in the "Parc du Cinquantenaire" a centre which may be described as scientific, educative, documentary and social and which comprises: (a) A "World Museum", subdivided into: National sections (actual conditions of the nations; universal geography); Historic sections (great epochs of civilization; universal history); Scientific and comparative sections (present state of knowledge and research); (b) A "Documentation Centre": A universal Bibliographical Inventory (13 ½ million cards); Documentary Encyclopedia (a million documents); International Library (150,000 volumes); (c) An International University (Summer sessions; International fortnights; Conferences, Courses, Permanent Study Centre); (d) A Central Office of International Associations (World Congresses, Special Congresses, Collective Publications, Annuals, Reviews, etc.).

The Development of Rural Life in France. — The "Association pour la rénovation artisanale rurale", 30, rue des Vinaigriers, Paris, is studying the best methods of facilitating the establishment in villages of artisans whose presence would be indispensable to the local agricultural life. It has therefore written to the local mayors asking whether: (1) any indispensable local trades exist in the district under their jurisdiction; (2) it is desirable to assist schemes for installing new artisans in these communes; (3) the young men of the district wish to learn a trade and if in the district there are master workmen capable of giving them proper training; (4) the creation and development of small family industries is possible or desirable.

This enquiry will gradually be extended so as to include every department, (*La Vie agricole et rurale* a. 16; t. XXXI, n. 33; 14 août 1927).

Pre-Cooling Station for Fruit at Cape Town. — This station was officially opened last February at Cape Town. It marks a new and important step in the trade dealing with the transport and exportation of fruit. It is the largest installation of its kind south of the equator and its technical equipment has been considered to be the best among similar installations of the pre-

sent time, comprising the latest applied discoveries in cool storage. It is the result of a long series of researches both theoretical and practical, undertaken since 1923 by Dr. I. B. POLE-EVANS, Head of the Botanical and Agricultural Division, and by Mr E. A. GRIFFITHS, Physicist to the South African Government. Its construction was begun in February 1925 and lasted 2 years. The inclusive cost was £250,000. There are 72 refrigerating chambers (each having 12 platforms), which can respectively carry 5 tons of fruit, so that each chamber will hold 5 tons. The upkeep costs are very low.

A Low Temperature Research Station with the most modern equipment was opened at the same time. A new type of refrigerator wagon has also been adopted, which will insure the proper transport of the fruit of the Transvaal.

Sir W. HOY, Director General of Railways and Ports, states that during the financial year ending 31 March 1926, a million cases of autumn fruit and 365,000 cases of citrus fruits were shipped from Table Bay Docks, where the pre-cooling station is situated, and that the total exports from the various ports of the Union during this period was 780,914 cases of citrus fruits and 1,855,144 cases of autumn fruit.

It is clear from a report published by the South African Department of Agriculture that South Africa enjoys unique advantages in her fruit trade. Thanks to her climatic and geographic conditions she can watch her fruit crops ripen at a time when there is no competition on the European market. Hence all efforts made by the Government of these regions towards better technical methods in exporting as large quantities as possible of these products must be amply repaid. (*Cold Storage*, April 1927; *Fruit Grower*, February supplement 1927; *Union of S. Africa Dept. of Agriculture, Science Bulletin*, No 56, 1926; *Bull mens des rens frigorifiques* a VIII, n 7; 1927).

CONGRESSES AND CONFERENCES.

Vth International Congress of Genetics. Berlin, 11-17 September 1927.—Among the reports presented were the following: The problem of evolution, R. V. WETSTEIN (Vienna); Eugenics, R. PRARL (Baltimore); Specific formation and multiplication of chromosomes, O. ROSENBERG (Stockholm); Chromosome relationships in hybrids, H. FEDERLEY (Helsingfors); Sexual hormones and Mendelian heredity in the gallinaceae, A. PÉZARD (Paris); Genegeographical Centres of cultivated plants, N. I. VAVILOV (Leningrad); Genetics of *Datura*, A. F. BLAKESLEE (Cold Spring Harbor); Non-Mendelian Heredity, C. CORRENS (Berlin-Dahlem); The problem of gene modification, H. I. MULLER (Austin); Contribution to the theory of "crossing over" phenomena, H. WINKLER (Hamburg); Organization and working of an animal breeding research department, F. A. E. CREW (Edinburgh); The question of sexual chromosomes, J. SEILER (Munich).

In all, over 100 reports were presented to the Sections of the Congress: 57 to the Section of *General Genetics*, 20 to the Section of *Cytology*; 16 to the Section of *The genetics of cultivated plants*, 8 to the Section of *The genetics of domestic animals*, 15 to the Section of *Human genetics*; 9 to the Section of *Eugenics*.

International Congress on Workmen's Gardens. Luxemburg, 20-22 August 1927. — The necessity for a return to the land as embodied in the possession of a strip of garden for each family was clearly shewn in the discussions. To insure permanent possession two conditions are essential: the establishment of institutions specially founded for the purpose and the intervention of public authorities to guarantee by appropriate legislation this social function of the land.

Luxemburg was chosen as the permanent headquarters of the International Bureau of Workmen's Gardens which was founded in October 1926. It is responsible for making studies of existing laws and regulations on the question in the different countries. A resolution was also adopted to send an appeal to all governments, requesting that favourable legal and administrative measures should be considered and given effect.

International Conference on Flour and Bread Production. Prague, Czechoslovakia, 1-10 September, 1927. — This conference was organized on the initiative of the Masaryk Academy with the object of encouraging improved economic methods in milling and baking and the production of better grain.

There were 2 sections: (a) Treatment of grain, (b) Treatment of flour; (c) Organoleptic and nutritive qualities of the bread and of the flour in relation to the taste of the consumer.

International Conference on Combustibles. London, 24 September-6 October 1928. — This Conference was held at the Imperial Institute, its organization being entrusted to the competent "British National Committee". Lord BALFOUR was elected Honorary President and Sir Alfred MOND the Acting President.

The technical programme was divided into 5 classes:— I. Solid Combustibles; II. Liquid Combustibles, III. Gaseous Combustibles; IV. General utilization of Combustibles; V. General Questions. Each class was subdivided in its turn into 4 sections: (1) Composition and Classification of combustibles; (2) Preparation of Combustibles, (3) Storage and Practical Management of Combustibles; (4) Utilization of Combustibles.

In class V the discussions dealt with questions of the training of technicians, the organizations established for an efficient use of Combustibles in industry and of the economic possibility of a better coordination of the various uses to which they are put.

Ist International Wool Congress. Biella, Italy, 19 September 1927. — Organized by the Italian National Wool Industry Association on the occasion of its 50th birthday and of the festivities organized by the city of Biella on its own account to celebrate the first centenary of the birth of Quintino Sella.

IIIrd International Technical Press Congress. Berlin, 26-29 September 1927. — Organized by the "Fédération Internationale de la Presse

Technique". General questions : I. Cartels, trusts and the Technical Press ; II. The position of the Technical Press in relation to the official reviews of the State, communes and other public bodies ; III. The Technical Press, the League of Nations and the International Economic Conference ; IV. Establishment of information offices for the sections of the International Federation of the Technical Press ; V. The International rights of authors and editors and the Technical Press ; VI. The support which the Technical Press should give to the establishment of an International Association of Experts and of a consultative Chamber of Experts in every country.

EXHIBITIONS, FAIRS AND COMPETITIONS.

Bicentenary Coffee Exhibition at San Paolo, Brazil, 7-30 September 1927. — This exhibition was arranged by the "Central Commemorative Commission for the Second Centenary of the Introduction of Coffee into Brazil". The exhibition itself was divided into four main groups referring respectively to coffee cultivation, the coffee industry and the coffee trade and also to those subsidiary requirements which in modern conditions of progress have now become indispensable for important agricultural undertakings, including sanitary equipment, gardens, library, etc. The four main groups were subdivided into various sections, some of which dealt with cognate industries as regards the machines for cleansing, drying, etc. used in the preparation of the product.

Group I : Agrolological conditions suitable for coffee growing ; The scientific principles of coffee growing, Transport of coffee from the plantation to the factory, Preparation and drying ; Storing, preservation, cleansing, etc. ; Bagging ; Transport (by rail and road) ; Factory accountancy ; Factory workers ; Land settlement ; Wages.

Group II : Machines used for the coffee crop ; transport technique ; Cleansing and bagging machines, etc. ; Mechanical equipment of the selling houses ;

Group III : Trade classification of Coffee, Trade quotations and sale ; Exportation.

Group IV : Subsidiary plants (sanitary, telephone installations, etc.).

General Exhibition of the Products of Ecuador. — The Quito Chamber of Commerce assisted by other similar bodies is organizing an exhibition of the agricultural, mineral and industrial products of Ecuador to be held in Quito probably during May 1928. When the different exhibits are staged, the Chamber of Commerce will publish a special number of the *Revista Oficial* in order thus to advertise the productive capacities of the country, its natural riches and its national scheme of bank credit. Copies of this publication will be distributed to all the business houses and institutions of the countries which have trade relations with Ecuador.

VIIth National Egg Producing Competition, Versailles. — This national competition which is organized by the Animal Husbandry Experimental Centre of Northern France was opened on 14 October and will last 48

weeks. A special section for ducks has been established with a capacity of a hundred birds. Numerous and valuable prizes will be awarded. For further information apply to *M. le Commissaire générale du concours de ponte*, 63, rue de Varenne, Paris.

Exhibition of Native Timbers, Guatemala City, 29 May-5 June 1927. — The Guatemala Department of Agriculture was responsible for this exhibition. Its objects were to make known the value of the national timbers by submitting samples for the opinion of experts in order that in each case their industrial qualities might be determined and also, if possible, that suitable trade outlets for these valuable native products might be discovered.

Control of Rural Depopulation in France. — The French "Union des Intérêts économiques" has organized a competition, for which French elementary school teachers alone were eligible, dealing with the best methods for checking the rural exodus. Prizes varying in value from 100 to 5000 francs were offered for the best reports on the question, which were to be sent before 1 November and further information can be obtained from the *Secrétariat de l'Union des Intérêts économiques*, 16, place de la Madeleine, Paris (VIII^e).

Italian National Competition for Ensilage. This competition was arranged by the Ministry of National Economy for landowners and the directors of agricultural undertakings who make normal and continuous provision for the systematic preservation of fodder crops by means of silos. The competition was to close on 31 October. The sum of over 110,000 Liras was voted to cover the costs, and the money was partly used for striking medallions to be distributed by the jury of the competition.

Further information can be obtained from the local Travelling Professorship.

GENERAL NOTICES.

The Control of the Fruit and Vegetable Market in British Columbia. — The market gardeners of British Columbia are following with interest the working of the Produce Marketing Act, lately passed by the local Parliament to secure a permanent control of the local market as affected by the abundance or scarcity of each of its products. Such regulations are radically different from the usual business methods which so far have proved unequal to the requirements of the market. The co-operative associations, which seemed the best means of market control, have been confronted by a serious difficulty. While the members of the co-operative associations had undertaken not to send their products to any particular market that was already overstocked, the independent producers were taking advantage of the situation and were sending their own produce to that market at prices lower than those actually current.

To meet this difficulty suitable government regulations were demanded and after long discussions in meetings of experts, a Commission of Control was form-

ed consisting of three members, one chosen by the cooperative associations, one by the independent producers and one chosen by the Government. This Commission is expected to exercise a complete control over the amount of produce sent to the markets and without its authority no fruit or vegetables can be sent out of the province. Heavy penalties have been fixed for infringement of the regulations that it may issue to suit the conditions of markets. The Commission has also the power to withdraw trade licences from offenders. (*The Canadian Horticulturist*, Vol. L, No. 4, April 1927).

Silkworm Breeding in Panama. — Last April the Government of Panama signed a contract by which the silkworm industry will be introduced into the country. The contractor has undertaken to plant 10,000 mulberry trees and to provide a corresponding fixed number of silkworm eggs. He is also to train 25 persons who are to devote themselves to the cultivation of the mulberry trees and the silkworm breeding. The Government for its part is to pay 7,500 dollars for the trees and 4,000 dollars a year to the contractor for organising the new industry. From this latter sum 20% will be subtracted as caution money for the fulfilment of the contract. (*Bulletin of the Pan-American Union*, August 1927).

JOURNALS AND REVIEWS.

A Series of Botanical Publications in Uruguay. — In *La Mañana* of Montevideo (May 11, 1927) it is stated that the rural association of Uruguay will undertake the publication of a series of books by Dr. W. HERTER on the flora of the basin of the river Uruguay (including the two Brazilian States of Santa Catharina and Rio Grande do Sul), the Uruguayan territory and the Argentine provinces of Misiones, Corrientes, Entre Rios and Buenos Aires. The first of these publications will consist of an "Index familiarum plantarum Montevidensis".

La Campana is the title of a new review dealing with rural life in Italy published by *L'Editoriale d'Italia*, 10 via Umbria, Rome. The first number appeared last July.

NOTES ON THE INTERNATIONAL INSTITUTE OF AGRICULTURE

Appointments on the Permanent Committee. — The following appointments of delegates to the Permanent Committee of the Institute have been made by the States named below :

Japan : M. TAKEYO OKAMOTO, Councillor at the Embassy in place of M. YASUSABURO MORI,

Esihonia : M. KARL TOFER, Minister at Rome in place of M. A. JURGENSEN

Persia : Baron LAZAR DE POLLAKOFF in place of the Marquis de ROC-CAGIOVINE

Adhesion of Bolivia. — The Government of Bolivia has decided to become an adhering member of the International Institute of Agriculture, thus bringing the number of adhering States up to 75

Representation of the Institute at Congresses and Meetings. — Arrangements have been made for the representation of the Institute at the following congresses and meetings. National Olive Growing Congress (Sardinia), 7-12 December, XVIIth Meeting of the International Institute of Statistics (Cairo), 28 December 1927-4 January 1928, International Congress on Home Economics (Rome), 14-25 November, International Conference on Emigration and Immigration (Havana), March 1928, ' Les Florales gantoises ' (Ghent), April 1928

International Congress of Horticulture at Vienna. — This Congress which met at Vienna last September has proposed the establishment of an International body responsible for questions relating to horticulture and decided in principle, on the motion of M. LUIS MARIA DEL CARRIL, the Delegate of Argentina, M. ELISEO RICCARDO CORNEZ, the Delegate of Uruguay and M. SIRKS, the Delegate of the Netherlands, that this organisation should take the form of a special section of the International Institute of Agriculture

The Congress referred the question to the Institute for consideration and the matter is now under discussion

Meeting of the " Bureau de l'Association Internationale Scientifique d'Agriculture tropicale et subtropicale ". (*Bureau of the International Scientific Association of Tropical and Subtropical Agriculture*) — This meeting, in which the Institute took part, was held at Paris from 10-12 October. A new article was introduced into the regulations, in view of the collaboration of the Association with the Institute, which is thus worded :—

" The Association in particular pledges itself to a constant collaboration between the Institute at Rome and itself in conformity with the resolutions of the Conference at Paris in 1926 and of the General Assembly of the International Institute of Agriculture in April 1926 ". The General Assembly of the Association will be held in Paris from 14 to 16 January.

Protection of Marks of Origin and Description of Cheeses and Unification of Methods of Analysis. — The replies of the Governments to the letter sent by the Institute, arising out of a resolution of the Dairy Congress held in Paris in 1926, have shown that the time is ripe for an international agreement on these questions. The Permanent Committee of the Institute has therefore decided to draft proposals and to continue its representation to the Governments

International Scientific Council and Permanent International Commission of Agricultural Associations. -- The month of October was almost wholly absorbed by the work of preparation for these two important meetings. In the Institute Notes of the month of September a number of details were given with regard to the various phases of the work of organization. In the November number a brief account of the proceedings in both cases will be published.

The World Agricultural Census of 1930. — Mr LEON M ESTABROOK, Director of the World Agricultural Census Project, after his journey to Peking, has visited in succession Hong-Kong, Canton, Formosa, French Indo-China, and the Philippine Islands

The competent Chinese authorities have promised to do their best to carry out so far as possible an Agricultural Census in 1930. The competent authorities of Hong-Kong, Formosa, French Indo-China and the Philippine Islands have confirmed their definite adherence to the scheme

The second Statistical Conference between Latvia and Esthonia was held at Riga from 15-20 September 1927. The object of the Conference was to discuss problems common to the two countries relating to agricultural statistics and also to statistics of foreign trade, labour and industrial questions, and to pass a series of resolutions covering this wide range of questions, capable of application in both countries.

In dealing with the World Agricultural Census of 1930 the Conference considered the means of applying the scheme and standard forms of the Institute to the special requirements of the two countries and drafted a form of questionnaire. The Director of the Central Office of Statistics in Lithuania also took part in the Conference and in a letter addressed to the Central Office of Statistics in Esthonia stated that Lithuania would be prepared to conform to the decisions adopted by the Conference so far as they relate to the Agricultural Census.

The next conference, in which Lithuania will also be represented, will take place at Tallinn (Reval) in May 1928 and among its objects will be the establishment of the final form of the schedules and of the detailed instructions for the Census for all three Baltic Countries

The estimated sum required for carrying out the Agricultural Census in Esthonia is 171,100 gold crowns, including the cost of publications. This estimate has already been approved by the Census Committee and has now been referred to the Parliamentary Commission for consideration with a view to definite acceptance.

— — —

Received by the Library

Ber. = Berlin, Cam. = Cambridge, Gen = Genève, Lon. = London, Mad. = Madrid, Mil. = Milan,
N.Y. = New York, Par. = Paris, Tor. = Torino, Wash. = Washington.

Aftalion, A. Le problème des prévisions économiques aux Etats-Unis. (*Revue d'économie politique*, Paris, 41^{ème} année, mai-juin 1927. p.833-860).

Bercaw, L. O. and M. G. Lacy. The apple industry in the United States. Wash., Gov. print off., 1927. 17op. 27,5cm. (United States. Bureau of agricultural economics, Bibliography No 19.)

Blatter, E. The palms of British India and Ceylon. Lon., 1926. 60op. front., ill. (incl. maps), 25,5cm.

Bordeaux. UNIVERSITÉ. INSTITUT D'ÉTUDES ET DE DOCUMENTATION ÉCONOMIQUES ET SOCIALES. Grande-Bretagne. Questions économiques (1922-1926). Paris, Recueil Sirey, 1927. 25p. 24cm. (Bulletin bibliographique, Série C., n°5-6)

Bordiga, O. Agricoltura e popolazione nelle provincie della Campania. Napoli, G. Barca, 1927. 26p., 28cm.

British GOAT SOCIETY's year book, 1927. Compiled and issued by the Secretary: Thos. W. Palmer. Lon., Thos. W. Palmer, 1927. 179p. 22cm.

Brouwer, W. Landwirtschaftliche Samenkunde: ein Schlüssel zum Bestimmen der kleinkörnigen Kultur samen sowie der wichtigsten Unkraut samen. Neudamm, Neumann, 1927. 130S., Taf. 25,5cm.

Les Colonies italiennes. 1927. 137p., illus., cartes 32,5cm., (*La vie technique et Industrielle*, Paris. Numéro spécial hors série. Supplément au numéro d'août, 1927).

Congrès INTERNATIONAL DU PALUDISME. Compte rendu du 1^{er} Congrès Rome, 4, 5, 6 Octobre 1925. Rome, Impr. du Sénat, 1926. 345p. 36cm.

Crohn, H. Der Mais in der Weltwirtschaft. Ber., Mittler & Sohn, [1927?], 64 S., Karte, Tab., 27cm.

Davidson, J. Conifers, junipers and yew: gymnosperms of British Columbia. Lon. Fisher Unwin, (E. Benn), 1927. 72p., 37pl., 24,5cm.

Deutsche LANDWIRTSCHAFTS-GESELLSCHAFT. Sonderdruck von Vortragen einer Kommission zum Studium der Nordamerikanischen Landwirtschaft. Ber., A. Scherl, 1927. 1926 37S., Abb., 32cm.

Eliacheff, B. La vie économique en Russie. (*Revue d'économie politique*, Paris. 41^{ème} année, mai-juin 1927, p.943-971).

Engberg R. C. Industrial prosperity and the farmer. New York, Macmillan Co., 1927. 286p., diagr., tab., 20cm.

Feldkamp, C. L. and C. E. Pennington. List of the publications on soils. Wash. Govt. print. off., 1927. 31p., 27,5cm. (United States. Department of Agriculture, Library. Bibliographical contributions, No 15).

Gillekens, G. Mes chroniques avicoles. Bruxelles, Victor Feron, 1927. 308p., ill., tab., 23cm.

Gillet, L. Catalogue des plantes du Jardin d'essais de la Mission de Kisantu (Congo Belge). Bruxel-

es, Imprimerie industrielle et financière, 1927. 166p.,pl.,port.,cartes, 24,5cm.

Goblet d'Alviella. Histoire des bois et forêts de Belgique. Des origines à la fin du Régime autrichien. Par., Lechevalier, 1927. 3v. pl.,carte,facsim., 25,5cm.

Greger, J. Mikroskopie der landwirtschaftlichen Unkrautsamen mit besonderer Berücksichtigung der Frucht- und Samenschale. Ber., Parey, 1927. 117S.,Abb.,22,5cm.

Haack, R. Grundriss des in Preussen geltenden Agrarrechts. Ber., Parey, 1927. 204S.,22,5cm

Highland AND AGRICULTURAL SOCIETY OF SCOTLAND. Transactions of the Highland and agricultural Society of Scotland with an abstract of the Proceedings at Board and general meetings, and the premiums offered by the Society in 1927. Fifth series. v.XXXIX. Edinburgh, Blackwood, 1927. 428p.,23cm.

Indochine. INSPECTION GÉNÉRALE DE L'AGRICULTURE, DE L'ÉLEVAGE ET DES FORÊTS. La-main d'oeuvre agricole en Indo-Malaisie. Hanoi, Imprimerie d'Extrême Orient, 1927. 72p., front.,ill.,carte,tab.,28,5cm.

Italie. ISTITUTO PER L'ESPORTAZIONE. La esportazione italiana di uva da tavola e la necessità di perfezionarla. Roma, Istituto, 1927. 6p,ill.,26cm. (Servizio A., Circolare n° 9).

Jones, ANNA M. The rural industries of England and Wales: a survey made on behalf of the Agricultural economics research Institute. Oxford, Clarendon press, 1927. 1v.,front.,pl., 22cm.

« v. 4: Wales ».

Kampffmeyer, H. Siedlung und Kleingarten. Wien, Julius Springer, 1926. 155S.,Abb.,21cm.

Koehne, C. Die Arbeitsordnung in der Land und Forstwirtschaft. Berlin, Reimar Hobbing, 1927. 92S., 24cm. (Leipzig. Universität. Institut für Arbeits Recht. Schriften, 12 Heft.)

Kuczynski, R. Deutschlands Versorgung mit Nahrungs- und Futtermitteln. Ber., Springer, 1926-1927. 4.Bde.,21cm.

« Bd. 1: Statistische Grundlagen zu Deutschlands Versorgung mit Nahrungs- und Futtermitteln. Bd. 2: Deutschlands Versorgung mit pflanzlichen Nahrungs- und Futtermitteln. Bd. 3: Deutschlands Versorgung mit tierischen Nahrungs- und Futtermitteln. Bd. 4: Deutschlands Ernährungs- und Futterbilanz. »

Lichtenberger, B. Die Milchindustrie der Vereinigten Staaten von Amerika unter besonderer Berücksichtigung ihrer maschinentechnischen Hilfsmittel. Herausgegeben von der Vereinigung der städtischen Milchgrossbetriebe Deutschlands in Dresden. Hildesheim, Molkerei-Zeitung, 1926. 275 S., Karte, Diagr., Facsim., Tab., 25cm.

Macklin, T. Making the most of agriculture: efficient marketing, profitable farming, worth while living. Boston, Ginn, [c1927]. 542p, ill., plans, diagr., 20cm.

Mexique. LOIS, CODES, ETC. Recopilación de las principales leyes expedidas por conducto de la Secretaría de agricultura y fomento: periodo de 1º diciembre de 1924 a 6 de enero de 1927. Tacubaya, Imprenta de la Dirección de estudios geográficos y climatológicos, 1927. 666p.,22cm.

Miller, A. Essai sur l'histoire des institutions agraires de la Russie centrale du XVI^e au XVIII^e siècle. Par., Giard, 1926. 384p.,25,5cm.

Minardi, A. L'economia rurale applicata alla zootecnia. Piacenza, Carlo Tarantola, 1927. 222p.,diagr., tav.,19,5cm.

National RESEARCH COUNCIL. A survey of American chemistry: including reports from Scientific committees, Division of chemistry and chemical technology, National research council. N. Y., Chemical catalog, [c1927], 1v. 22cm.

v.1. July 1, 1925 to July 1, 1926.

Nourse, E. G. The legal status of agricultural cooperation. N. Y., Macmillan, 1927. 555p.,19cm.

Pirtle, T. History of the dairy industry. Chicago, Mojonnier Brosco [c1926], 645p, ill, tab., 24cm.

Ranieri, S. Gli infortuni del lavoro in agricoltura. Torino, Luigi Checchini, 1927. 374p, 25,5cm.

Rehder, A. Manual of cultivated trees and shrubs hardy in North America, exclusive of the subtropical and warmer temperate regions N. Y., Macmillan., 1927. 930p., 22cm.

Rossi, G. B. El Yemen : Arabia felix o Regio aromatum : appunti di geografia, storia, usi e costumi. Torino, M & G. Rossi, 1927. 62p., tav., rit., carta, facsim., 25cm.

Schück, W. Organisation und Betrieb des brasilianischen Importhandels. Stuttgart, C F Peoschel, 1926. 89S, 24,5cm. (Weltwirtschaftliche Abhandlungen, 9.Bd.).

Seeböhm, M. E. The evolution of the English farm. Lon., Allen & Unwin, 1927. 376p, front ill, pl., 22,5cm.

Somerville, W. How a tree grows. Lon., University press, 1927. 212p., ill, 21cm.

Suomen METSÄTIETELINEN SEURA. Silva fennica, 1, 2, 3. Helsinki, Finska litteratursällskapets tryckeri, 1926-1927. 3 fasc, 24,5cm.

Teixeira da Fonseca, E. Oleos vegetaes brasileiros : inclusive resinas, gomas, breu, ceras. 2ª ed. Rio de Janeiro, [S.n.e.], 1927. 341p, cuad., 24,5cm.

Tornyay, Baron von. Die Bodenreform und ihre Wirkung auf die Entwicklung der ungarischen Landwirtschaft. Budapest, Grill'sche Hofbuchhandlung Julius Benko, 1926. 100S, Taf, Tab., Diagr., 24cm.

Ulpiani, C. Opera omnia. Casalsmonferrato, Marescalchi, 1927. v.1 front, 26cm.

United States Standards for honey. Recommended by the U. S Department of Agriculture. Wash Govt. print off., 1927. 32p, 24,5cm. (United States. Department of Agriculture, Department Circular 410)

Vanderlinden, E. Observations phénologiques sur des végétaux. Bruxelles, Imprimerie médicale et scientifique, 1922. 14p, 4tabs., 15diagr, 27.,cm.

Nouveaux Périodiques.

Forestry. The Journal of the society of foresters of Great Britain. London, Humphrey Milford, Amen House, E. C. 4., 1927 Vol. I, Number I. 130p, 24,5cm.

* The Journal will be published annually in the first instance, but the number of issues per annum may be increased later. Price 7/6d. *

Direttore responsabile: Prof. CARLO DRAGONI

Roma — L'Universale • Tipografia Poliglotta (C. I. di Roma, n° 18891)

ECONOMIC AND SOCIAL QUESTIONS

CREDIT

A Suggested Credit Scheme for English Farmers.

ORWIN, C. S. : Credit for the Farmer. *Observer*, London, 17 and 24 July 1927.

Mr. C. S. Orwin, Director of the Institute of Agricultural Economics, Oxford University, has put forward a scheme for meeting the English farmer's need of credit. He suggests that the agricultural co-operative trading societies should give their members credit by transacting business with them for future settlement.

To put the societies in a position to do this Mr. Orwin suggests that every member should be required to subscribe for the maximum amount of share capital (£200) authorised under the Industrial and Provident Societies Act, though only a small percentage of this amount need be called up. Credit should be given for three, six, nine, or twelve months. No credit for a period longer than three months should be given by the manager of the society without the sanction of the committee in every case. Settlement for goods purchased on credit should be made at the cash price plus interest at the rate of $1\frac{1}{2}$ per cent., 3 per cent., $4\frac{1}{2}$ per cent., or 6 per cent. according to the term. The invoice for the goods should be accompanied by an acceptance, covering cost and interest, which should be returned by the member to the society within fourteen days. All acceptances should be deposited with the society's bankers for discount or collection at the due date.

Acceptances should only be renewable in special cases and with the sanction of the committee, where the member can show cause. The rate of interest could be varied according to the conditions of the money market.

The security of the uncalled capital should enable the society to obtain large advances against its members' acceptances, backed by the society itself. There would be no advantage in making calls beyond the bare needs of the preliminary expenses of the society, as the larger the uncalled capital the greater would be the security. The joint-stock banks would only concur in the transaction of business on the foregoing lines in the case of well-managed societies, and Mr. Orwin suggests that the Ministry

of Agriculture should undertake a half-yearly scientific audit of the books of the co-operative trading societies and come to an understanding with the joint-stock banks that they would make advances by way of overdraft to co-operative societies against the security of their uncalled capital and their members' bills, upon the production of a balance sheet certificated by the Ministry's auditors at the commencement of their relations with the banks and subsequently at the end of each half-year.

Mr. Orwin points out the various advantages of his scheme, but it may be objected that it calls upon all farmers, large or small, to make the same initial sacrifice and to undertake the same liability. The system of discounting the members' acceptances, or obtaining overdrafts on the security of them, places the society, as such, financially in approximately the same position as a society which deals with its members on a cash basis. But even a society doing business on a cash basis has need for a considerable working capital, unless it confines itself merely to buying goods when ordered by members. If the society carries a stock of goods and undertakes delivery to members' farms it must either call up a large proportion of the share capital or obtain loans from the banks. If all members subscribe the same amount of share capital, all must pay up the same amount, and all are liable to the same extent, not only in respect of loans obtained for giving credit to the members, but also for the loans obtained for ordinary working capital. Moreover, losses resulting from bad management would eventually have to be made good out of the uncalled share-capital and so would fall equally on all members, irrespective of their financial condition.

Reorganisation of the Agricultural Credit Department of the Bank of the Republic of Uruguay.

Memoria y Balance General correspondientes al ejercicio terminado en 31 de diciembre de 1926 Banco de la Republica Oriental del Uruguay Montevideo, 1927

During 1926 the Bank of the Republic developed its agricultural credit operations in accordance with a carefully thought out scheme designed to meet the requirements of the principal industries of the country, which are nearly all agricultural. In particular with a view to minimising the consequences of the serious crisis in the meat market which had brought about a marked fall in live stock prices, it was considered essential that the Bank should come forward with more generous credit for breeders, a systematic scheme of mortgage loans for land transactions, and loans for improvements and for working expenses.

As regards duration, the loans are distinguished as follows:

(a) annual loans, or loans for a less period than one agricultural year, when repayment can be made within that time: *e. g.*, for seeds, live stock, harvesting of cereals under guarantee, fruit-growing, vine-growing, etc.

(b) loans for two years, repayable after one year, as in the case of

loans, with guarantee of pledge of produce, for the purchase of farms, plantations, etc.

(c) loans for three years, in the case of plants and installations which have an initial unproductive period. In this case an amortisation payment has to be made by the business in question of 20 per cent. in the first year ; in the second year, known as the year of equilibrium, of 30 per cent. ; in the third year, when a return may be expected, of 50 per cent.

(d) loans for from 5 to 10 years. Loans for a period longer than three years are mortgage loans and are calculated, each case on its merits after a technical inspection and an enquiry into the solvency of the applicant. Amortisation payments may be from one-fifth to one-tenth according to circumstances. As a rule the repayments are made over periods as follows : in the case of loans for five years, for land or cultivation improvements, a 20 per cent. amortisation payment is made annually ; in that of loans for ten years the annual payment is 10 per cent. These ten year loans are mainly made with the object of facilitating the purchase of small farms for direct cultivation and accordingly of encouraging division of estates which lend themselves to this purpose. They are loans of an intermediate character as compared with the true mortgage loans which are made for thirty years.

(e) loans for the purchase of breeding stock. In the case of these loans to breeders, the applicant must deposit pedigree certificates of the Herd Register and must adduce proof of the method of using the farm.

(f) mortgage loans for general encouragement of agriculture. These are loans of two kinds : special loans for the sub-division of farmlands for the benefit of agriculturists and stock breeders who can pay 40 per cent. of the purchase price in cash and loans for cheap dwelling houses, rural industries, etc. In the first case the amortisation is effected by annual payments of 10 per cent., in the second case by similar payments of 20 per cent.

(g) loans on guarantee of cereals. The cereal is deposited and kept on certain premises, after acceptance by the Bank which may make an advance up to 60 per cent. of the value.

(h) loans for the establishment of holdings, dairies, cheese factories and so on. Usually these loans are made for three years, with amortisation payments of 20, 30 and 50 per cent. respectively in the three years. They were instituted in 1926.

Another feature of the new organisation of agricultural credit by the Bank is the institution of services of technical agricultural inspection, in connection with the department of technical propaganda.

The main object of this inspection is naturally that of ascertaining the economic use of the funds advanced and the possibility of repayment and in consequence the solvency of the debtor ; the indirect result however is one of great importance for the agricultural economy of Uruguay, as the Bank experts, who divide the area among themselves into six zones, arrive at a comparatively full knowledge of the true conditions of agriculture throughout the country, the concrete requirements for development, the causes of crises, the variations in the value of the

land and of agricultural pledges, and so can take measures to prevent inflation of prices or excessive depreciations, and are able to work in harmony with the other experts appointed for propaganda in connection with rural credit. These latter entered on their work in 1926 by giving lectures during harvest time, but will now be expected, in accordance with the programme of the Bank, to make extended studies of agricultural economic subjects, in particular of markets, cost of buildings and improvements, and to encourage the use of machinery, the employment of savings for purchase of lands in accordance with the special forms of mortgage adopted for purposes of home colonisation.

Subsequently this propaganda is to be extended gradually into the sphere of rural accountancy.

The statistical data which form an appendix to the Bank report for the year 1926 reveal the steady progress of the agricultural credit department in the thirty years of life of the institution. The following summary may be added of the operations of the Bank for agricultural purposes in 1926: loans guaranteed by agricultural pledge, 729,453.23 pesos; mortgage loans, 2,454,466.92 pesos; loans for seeds, 155,203.64 pesos, and agricultural credit discounts, 309,901.59 pesos.

MARKETING OF AGRICULTURAL PRODUCE

The Organisation of the Milan Fruit and Vegetable Market and of the Centres of Supply.

TAGLIACARNE, G.: Il mercato delle frutta e verdure a Milano *Studi e Note*, Nos 3 and 4 Rome 1926 July-September and October-December. Ministero dell'Economia Nazionale Istituto di Economia e Statistica Agraria — PORUZZI, Dr Remo: L'organizzazione delle vendite collettive dei prodotti agricoli deperibili in Italia *Quaderni dell'Istituto Federale di Credito per il Risorgimento delle Venezie*, No 8, Venice, August 1926.

In view of the interest which attaches especially at the present time to the study of marketing questions, the Milan fruit and vegetable market has been recently made the subject of detailed enquiry. This market is the most important in Italy handling as it does every year from one and a half million to two million quintals of fruit (including citrus fruits) and vegetables. The information obtained from a number of qualified persons and organisations has been carefully checked with the object of ascertaining the channels by which the products pass from grower to consumer and their prices at the various stages; the purpose being to discover whether, in the actual market organisation or in the series of transfers made, there are or are not factors tending to an artificial heightening of prices.

The market which is under the management of the Commune covers a surface of 70,000 square metres with 53 covered cemented stands, from 150 to 250 square metres in area, each with a storeroom in brickwork and a cellar. The use of these is granted to the commission agents (of whom some account follows), who pay a yearly rent of 60 liras the square metre; some twenty of these make use instead of temporary wooden stands and about eighty use stands under an iron roof without store place or cellar, in each case paying a yearly charge of 50 liras the square metre. There are besides 359 stands each about 12 square metres, under large iron roofs, the use of which is granted to the market gardeners for a rent of 40 liras annually per square metre. In addition 73 salesmen make use of a raised platform of brick work, paying a yearly rent of 40 liras the square metre. Besides the fixed stalls which are all under cover, daily permits are given for the use of areas of varying size in the market gangways for the sale of certain seasonal products. Fixed charges are made on the basis of a special tariff for the various services, policing, weighing, portorage, carting, etc.

The "Operators" of the Market. — These are represented by (a) the commission agents; (b) the market-gardener, and (c) the small wholesaler and the retailer.

As regards the first it may be noted that except in rare cases every commission agent is also operating as dealer on his own account, acting as salesman on commission mainly when it is a question of readily perishable goods, and as independent dealer in the case of more lasting produce and when the market is more steady and less risky. The commission agents usually receive the goods direct from the growers, or from exporters from the place of origin, who keep an agent or representative on the market place from whom they daily receive information as to the advantage or not of despatching produce. The commission agent takes over the stuff sent, keeps note of the sales as they proceed and remits the consignor either at the end of the market or at latest on the day following the total proceeds less the cost of railway transport and the commission fee, usually reckoned at 10 per cent. In this percentage are included the *star del credito*, i. e. the charge representing the risk inherent in the credit given by the salesman to the purchaser, the charges made for release of goods at the railways, for unloading, portorage, hire of baskets, etc. The amount is remitted by means of a cheque, to which a detailed sales note is attached. It should be noted that the *star del credito* represents a substantial risk incurred by the salesman, especially in periods of slack business and scarcity of money; while the salesman has to remit day by day the amount of the proceeds, he in his turn receives payment for the goods at the end of the week or of the fortnight; credit losses are not infrequent and amount to about one per cent. of the takings on commission. As a safeguard against any malpractices on the part of the salesman, and in particular against the risk of their acting only in their own interest in making the sales, the growers or consignors inform each other of the current prices and generally obtain, in various ways, reliable information on the course of the markets; the majority of them have on all the markets trustworthy informants who send information by telegram. Moreover if a salesman does not give satisfaction the grower

or consignor ceases to make use of him ; there is always plenty of choice, as there are more than 150 salesmen on the market.

The second type of " operator " is represented by the market gardener. More than half of the vegetables handled on the market, in fact about 500,000 quintals yearly, are brought in every day by the market gardeners who grow a great variety of such produce over an area of approximately 1,500 hectares, situated on the outskirts of Milan, within a radius of from 10 to 20 kilometres. There are more than 500 of these growers, and they sell their own produce, usually for cash, but sometimes on credit.

In the next place there are some hundred dealers who sell always on their own account, either as " small wholesalers " or as retailers, every kind of fruit and vegetable, bought from the commission agents and from the market gardeners already mentioned. Their customers are for the most part the housewives of the districts close to the market and the sales are usually for cash.

Prices are reported every day by two officials of the management board of the market, who obtain information from the salesmen and from the market gardeners as to the current prices of that day for the various kinds of fruit and vegetables shown on the list, the information received being checked in every possible way. The list, which is posted in the market and published in the various daily papers, shows separately the prices charged by the commission salesmen and those made by the market gardeners.

Place of Origin of the Fruit and Vegetables. — It has been already stated that the quantity of stuff brought in every year to the market by the market gardeners of the area round Milan may be calculated at about half a million quintals : to this may be added more than one million quintals of produce supplied to the market by other production centres in Italy. Some account will be given of these with special reference to the channels by which this market is supplied and to the systems followed on other markets for the assembling of the produce, for sales etc. The centres in question are : Liguria, Piedmont, Venetia, the Trentino, Emilia and Romagna, the Marches, etc.

In Liguria the majority of the growers are organised into co-operative societies, federations and associations, and forward the goods through these organisations to the markets of Milan, Genoa and Turin. In this way all intermediaries are eliminated and a reduction on the railway rates is obtained owing to the arrangement made by the co-operative societies for consignment in truck loads. The proceeds of the sales are sent direct to the individual growers. The growers often go themselves to Milan to look after the unloading of the produce and to direct the sales, though the selling is always left in the hands of the salesmen, who take the usual commission of 10 per cent. and pay the grower immediately after the sale of the stuff, while collecting the price themselves later.

In Piedmont chestnuts are the product most generally handled. They are brought to the principal markets of the region by the producer, who sells them by means of a middleman to a dealer or exporter, taking the payment immediately. The dealer does any necessary preparation of the product

and consigns it to the consuming markets. Many Milan dealers, however, are in the habit of buying direct from the growers.

In Venetia three systems of sale are followed for the main product, peaches. Sometimes the grower himself selects the fruit, places it in small wicker cases holding from 5 to 10 kilogrammes, and sends it direct to Milan or other markets, to the care of a salesman on commission. In some areas, on the other hand, local hucksters contract, even before the crop is gathered, for the whole produce of a holding for a given sum, assuming the risk of whether the season is good or bad. They make arrangements for the sorting of the fruit, and send it to be sold on commission in Milan and on other markets or export it abroad. In the district of Verona the usual practice is for the grower to bring in the fruit to the market to sell it directly to the dealer or exporter, without as a rule making use of any intermediary. The exporter or local dealer then sends the fruit to Milan.

In the Trentino the orchard produce is sold either on the tree or after the crop is gathered. In the first case a huckster travels over the countryside and makes a contract for the whole output of a holding taking the crop risks; not infrequently he makes a contract for several years, a procedure made possible by the specialisation and concentration of the fruit crops, whether pears, apples or peaches. At times the produce of the orchards or gardens is sold at so much a quintal after the fruit is gathered; the purchaser transports it to his storehouses for sorting, packing and consigning. In other cases, growers' co-operative societies prepare the produce and sell it direct, on the spot or on the consuming markets either at Milan or elsewhere.

The Milan market is largely supplied from Emilia and the Marches. As in the Trentino, the produce is sometimes collected and handled by co-operative societies, especially by associations of small growers, for example the growers of Massalombarda peaches, the consignment to the markets also being in their hands; or large landowners may themselves handle the fruit, packing it and sending direct to Milan or to other markets. The market of Cesena in Romagna is important for cherries.

In the Marches certain co-operative societies are in working, particularly at Jesi, Cupra Marittima, Fano, Pedaso. These collect the produce of a number of owners, prepare, pack and consign it to Milan or elsewhere. The proceeds of the sales, deducting 10 per cent. which goes to the salesman, are sent to the management committee of the co-operative society, which represents the bulk of the growers concerned and which undertakes to divide the amount between them in proportion to the quantities supplied and the quality of the goods, after deduction of the expenses incurred. Where there are no co-operative societies, dealers and exporters obtain the products from the growers in the country districts, often with the help of middlemen and agents, to whom a commission is paid, the amount varying with the locality, the quantity of work done, etc. The exporter does not undertake any risk as regards general harvest conditions, and pays, usually in cash, the sum agreed.

The Milan market is supplied from other regions also; among these is Sicily, the great producing area for citrus fruits, which are sometimes bought

direct from the dealers themselves, more often from exporters or dealers of the centres of production who, after grading, send the fruits to Milan or elsewhere.

Railway Rates. — The cost of railway transport varies according to the goods, the place of origin and the rates ruling in each case. The consignor may send fruit and vegetables by slow or fast transit (*piccola* or *grande velocità*) and may in either case make use of an ordinary rate or of special rates by which certain advantages are secured in transit. The *piccola velocità* is used for goods not liable to rapid deterioration; *grande velocità* is used instead for other products, especially for fresh fruit. Special fast transit (*acceleramento*) may be applied for in the case of certain goods, as well as the use of express trains for the transport of flowers, strawberries, raspberries, and other perishable products. There is a higher rate for the use of *acceleramento*, as well as for that of the express trains. The special rates are only applicable to truck load consignments.

Prices of products. — The most interesting part of this enquiry is that relating to prices, on which the following information was obtained:

1. In passing from grower to consumer the prices of fruit and vegetables are doubled or trebled, even if the increase is not more. Even taking into account all the expenses, transport, deterioration of the produce, margin of profit, etc., there is still a great difference between the price at place of origin and that to the consumer. Among the difficulties encountered in the attempt to explain these differences is that arising from the successive sortings to which the product is subjected before it reaches the shop of the retail dealer; a process during which that part of the produce of which it is desired to keep track gradually loses its original characteristics as it goes further from the place of origin and becomes more and more difficult to identify. Still more difficult is the calculation of the expenses to be charged on any one unit.

2. Considerable price increases occur in the passage of the goods from the central market to the shops; this is often explained as due to the excessive number of shops, leading to the distribution of all the general expenses of working over small quantities of goods, making the selling prices per unit very high; in addition there is considerable loss by wastage.

3. On the street markets of the different wards of the town, the price increase is reported as not very large, the explanation being that the expenses of the costermonger's barrow are lower than those of the shop; besides, whereas the shops supply a certain variety of products, the costermongers of the street markets buy as a rule only one commodity in fairly large quantities, thus getting advantageous prices; moreover they often get special bargains, profiting by special market conditions, surplus stock, very ripe fruit, etc.

It has been noted on the other hand that the shops, though their prices are higher, usually get more custom, partly because they often give some days credit, whereas the barrows and the street markets only sell for cash, and partly because the shops are open at hours when the markets are not selling. The main reason however, is that housewives consider it more dignified to make their purchases in shops rather than from barrows. Un-

doubtedly the greater freedom of choice in the shops and the possibility of bargaining tend to attract custom.

In the final conclusions of the enquiry stress is laid on the necessity for organisation among producers if they are to obtain the best price for their goods. It is regrettable that in certain regions growers are unfamiliar with co-operative societies or similar organizations and trust to hucksters and middlemen whose commissions are high. Growers are also recommended to make improvements in the preparation and packing of the products to be sent to consuming markets and to be exported abroad. Consumers are asked to maintain a certain conscious elasticity of demand in respect to fruit and vegetables, which undergo very wide fluctuations of price from one day to another.

FARM ECONOMICS

The Condition of Peasant Farms in the U. S. S. R. as shown by a Study of their Accounts.

Раевич, Г. Денежный баланс крестьянского хозяйства (Raevitch : *Economic budget of the peasant farms*). In : Статистическое Обзорение (*Statistical Review* No. 5. Moscow, 1927. -- Крестьянские бюджеты (*Peasant farm budgets*) In : Статистический справочник СССР (*Statistics of U. S. S. R.*). Moscow, 1927 — Budgets des paysans. In : Abrégé des données statistiques de l'U. R. S. S. Moscow, 1925. — TSCHAJANOW, Prof. A. W.: Die Landwirtschaft des Sowietbundes. Berlin, 1926.

The revolution of October 1917 placed in the hands of the peasants up to 95 per cent. of all the cultivable land, and made the peasant the absolute owner of the land, subject to the limitations prescribed in the law on its nationalisation. This new agrarian constitution and the new social and economic relations set up in the country districts have necessarily had a marked effect already on the whole course and progress of Russian rural economy, and in particular on the changes in the single factors in the peasant farms. Hence it came about that as early as 1919, when civil war was raging throughout Russia, the Moscow Central Statistical Department began to make studies of the accounts of the peasant farms. Studies of such accounts had also been made before the war, thanks especially to the beneficent action of the *zemstvos* or provincial self-governing administrations, but only in a somewhat sporadic way, whereas now the study of the accounts of peasant farms is one of the regular branches of the State statistics. The Central Department of Statistics has recently published as many as 10,000 monographs descriptive of separate farms in each year. These data are collected in accordance with a uniform plan, throughout the

whole territory of the U. S. S. R. They present, therefore, to a certain degree, a sufficiently exact picture of the changes in the factors of production which have taken place in all the 23 or 24 million peasant farms. And if as a rule the enquiry is directed on the farms more solidly organised and therefore less typical, this is balanced, as Prof. LITOSHENKO (1) has justly observed, by the general tendency of the population to supply information rather below the truth as regards their farms; and as a consequence the budgets examined approach very closely to the average figures for the peasant economy.

The study of the material collected is becoming of increasing importance and recently endeavours have been made to compare these data with the pre-war figures. At the present moment, however, the latest figures, namely those for 1925-1926, although not yet published in full detail, are of special interest, as well as others peculiarly characteristic for the previous years (2).

Tendencies of the circulation of capital in the peasant farms. — The total capital invested in the peasant rural economy before the war was 18,497.7 million roubles (an average of 996 roubles per farm). In 1924 the total sum had fallen to 15,075.6 million roubles, which amounted to an average of 876.65 roubles per farm. The capital invested in farms of various size groups was as follows:

Farms up to 2 desiatines	535.70 roubles
» from 2 to 4 desiatines	695.13 »
» from 4.01 to 6 »	964.09 »
» » 6.01 to 8 »	1,123.04 »
over 8 desiatines	1,645.40 »
Average	876.65 roubles

The tendencies of the circulation of capital, the receipts and expenditure for a peasant farm in the various regions of the U. S. S. R. during the three consecutive years 1923-24, 1924-25, and 1925-26, are shown in Table I (page 301).

Even from a cursory examination of this table it may be noted that the average amount of the receipts is increasing from one year to another in all the regions. The largest increase in receipts is found in the Moscow industrial region, where it rose from 291.91 roubles in 1923-24 to 638.53 roubles in 1925-26, in the Northern Caucasus where in 1925-26 it reached 553.13 roubles, and in the Ukraine, the steppe region, where the rise was from 214.84 roubles to 480.74 roubles in the corresponding years. The lowest actual figures are to be found in the case of the farms of the northern region, the receipts only rising from 73.81 roubles in 1923-24 to 277.02

(1) ЛИТОШЕНКО: Крестьянские бюджеты 1922-23 г. (*Peasant budgets for 1922-23*). Moscow, 1923.

(2) Investigations for the ascertainment of the yield of farms mainly devoted to sugar beet cultivation have also been carried out by the Institute for Scientific Enquiry into Rural Economy, Moscow.

TABLE I. — *Changes in the Circulation of Capital in Peasant Farms (in roubles).*

Regions	Years	Total receipts	Receipts per farm			Purchase of manufactured products per farm
			Amount realized by sale of		From non agricultural occupations	
			field crop products	quota cereal products		
1 Northern	1923-24	73 81	9 55	—	28 31	22 96
	1924-25	208 94	13 25	7 80	84 91	77 66
	1925-26	277 02	6 53	8 53	119 79	105 00
2 North West	1923-24	152 88	12 74	—	69 98	44 95
	1924-25	255 30	22 24	4 72	127 31	76 47
	1925-26	363 63	44 87	8 37	177 20	143 80
3 Western	1923-24	141 43	38 09	—	34 87	43 55
	1924-25	255 77	53 28	15 72	89 68	82 58
	1925-26	312 67	61 49	12 97	136 07	127 10
4 White Russia	1923-24	69 55	12 59	—	6 41	20 73
	1924-25	147 14	3 02	16 56	34 59	65 67
	1925-26	258 62	40 44	19 56	69 15	118 00
5 Moscow industrial	1923-24	291 91	28 46	—	99 27	99 79
	1924-25	491 68	58 01	14 66	28 82	181 61
	1925-26	653 33	60 90	13 36	386 00	254 20
6 Central agricultural	1923-24	179 91	26 01	—	40 36	37 83
	1924-25	211 66	40 02	19 01	77 13	66 82
	1925-26	337 94	64 16	33 54	134 85	126 15
7 Volga Canal	1923-24	91 91	9 33	—	35 90	22 03
	1924-25	161 90	25 12	14 35	75 09	55 02
	1925-26	260 03	34 22	17 18	139 81	107 50
8 Volga	1923-24	1 75	27 17	—	13 04	41 01
	1924-25	67 78	31 13	16 33	46 72	69 50
	1925-26	407 67	105 01	78 95	124 95	152 90
9 Northern Caucasus	1923-24	—	—	—	—	—
	1924-25	355 40	111 36	66 56	67 44	156 95
	1925-26	533 13	231 14	170 28	90 21	277 70
10 Ukraine (Right littoral)	1923-24	111 70	13 11	—	20 78	38 60
	1924-25	189 73	31 09	16 71	51 05	68 17
	1925-26	335 39	60 40	27 59	86 13	135 66
11 Ukraine (Left littoral)	1923-24	151 57	3 95	—	29 90	49 18
	1924-25	208 17	38 63	18 91	59 12	72 38
	1925-26	396 92	107 12	37 27	98 45	100 39
12 Ukraine (forest)	1923-24	83 77	20 97	—	13 48	29 73
	1924-25	169 11	47 51	16 33	46 00	62 79
	1925-26	313 54	73 26	24 09	81 66	139 20
13 Ukraine (steppe)	1923-24	214 84	68 23	—	33 35	96 73
	1924-25	319 34	70 18	50 77	103 49	127 66
	1925-26	480 74	135 85	111 81	103 35	216 99
14 Siberia	1923-24	8 61	11 68	—	13 73	27 86
	1924-25	187 52	38 34	28 90	44 12	77 61
	1925-26	309 72	64 95	39 86	85 37	138 10
15 U S S R	1924-25	251 9	—	—	100 76	98 38
	1925-26	401 8	80 36	46 37	146 26	169 92

roubles in 1925-26 ; on the other hand the relative increase is here greatest, as the receipts have nearly quadrupled in the three years ; in the Volga region and that of the right littoral of the Ukraine the receipts have more than trebled ; and so on.

Corresponding to the economic special characteristics of the separate regions the main part of the receipts in the agricultural regions, *i. e.*, the return from the field crops and from non-agricultural occupations — the only receipts shown in Table I — consists of the money from the sale of the products of the field crops ; as for example, in the Northern Caucasus, where the receipts from the field crops are more than doubled, while those coming from non-agricultural occupations increase less than one and a half times. The contrary is the case in the Moscow industrial region, where the amount resulting from non-agricultural occupations is nearly quadrupled, while the receipts from the sale of agricultural products have not quite doubled. The same phenomenon is noticeable in the Western region, in respect to the receipts from sale of cereal products.

Parallel to the increase in the general takings there is everywhere and noticeably an increase in the expenditure on manufactured products, sometimes amounting to nearly half the whole amount taken ; thus, for example, in the Ukraine (steppe region), in Northern Caucasus, in White Russia, and so on.

Composition of the Farm Budget. — The main heads of the peasant budgets (omitting the items of secondary importance), as corresponding to the quantity of the sown areas of their farms, are shown, as percentages, in Table II (page 303).

As appears from this table, what is brought in by the sale of the products of the field crops represents more than one half of the receipts (51.6%) but only on the larger farms with a sowing area of more than 16 desiatines, while in the medium groups, with a sowing area of from 2 to 10 desiatines such takings only amount to 12.2 to 26.7 % of the receipts and drop to 2.5 % in the group of the smallest farms. The proportionate diminution of the receipts from cultivation accompanying the gradual shrinkage of the sowing area of the farm — as shown by the figures of the budget enquiry — is not readily to be ascribed to any direct causal dependence of the one on the other factor without the risk of taking as a cause what is in fact only one element in the whole causal nexus, *i. e.* the whole economic structure of the separate regions in which the farms have been subjected to the enquiry in regard to budgets.

A no less interesting fact is that the receipts obtained from the sale of live stock, poultry or milk products exceed those of the sale of field products in the lower and medium groups, as also for all the farms of the Union, where the takings from the field products represent 20 % and those from the stock breeding and from the milk products represent 23.1 % ; while in the higher groups the opposite is the case. Thus in the farms with an area of 10.1 to 16.09 desiatines, the receipts derived from the field products are equal to 36 %, those relating to stockbreeding amount to 26.9 %, while in the group of larger farms, of more than 16 desiatines, the difference is still more considerable and the corresponding figures are equivalent to 51.6

and 12.1. In the enquiry into the receipts resulting from stock breeding, however, it was not always possible to ascertain whether the sales were of stock actually bred for sale, or whether at times there was also a forced sale of stock which was an essential part of the farm. In this latter case the sale would not of course stand for any increase in the farm receipts, but would rather point to its decay. Generally speaking, however, it may be said that the stock breeding receipts constitute an important part of the receipts of the farms of the higher groups in the consuming region of the Union, where the sale of stock breeding products is developed by farms undertaking contracts, while in the producing region of the Union, receipts from field cultivation take the place of importance.

The receipts from the various branches of industry are of considerable importance to the peasant farmers and the smaller the farm, the larger is the proportion such takings bear to the whole budget. The same may be said of the earnings from work done on neighbouring farms. The peasant farmers even of the large farms have recourse to subsidiary industrial or other work that takes them away from home. This fact is, in the South of Russia, partly explained by the superabundant agricultural population of those regions, while in the consuming regions it is the result of the higher return given by the branches of industry in the regions in which industry is more widely diffused.

Turning to the expenditure, it should first be noted that the largest item is that relating to the purchase of manufactured products, farm stock and building materials. Taking the farms in the Union as a whole the percentage figure is 42.8. In absolute figures this expenditure for certain regions may be shown as follows for 1925-26.

TABLE III. — *Expenditure on Purchase of Industrial Products (average per farm).*

Regions	Farm stock	Farm implements	Building materials	Foodstuffs	Clothing	Drapery etc.	Boots, shoes etc	Tobacco	Soap, etc	Illuminants	Total
1. Northern .	10.44	2.29	7.12	34.61	3.17	21.01	10.53	5.80	2.72	4.63	115.53
2. Central Agricultural . . .	12.38	3.03	10.67	25.61	7.31	24.58	22.16	3.28	4.36	5.84	134.73
3. Orenburg of the Baschkirs . . .	16.04	3.01	10.37	20.93	6.72	32.53	14.43	3.19	3.24	4.83	127.29
4. White Russia . .	19.27	3.40	6.0	23.83	5.58	18.96	15.40	4.38	2.84	4.16	116.54
5. Volga . .	10.66	5.21	13.58	23.41	8.03	41.82	23.97	3.70	4.68	5.03	167.75

From this statement it appears that the largest outlay of the peasant farmers is on the purchase of industrial products: clothing, textiles and

boots and shoes ; next follows the expenditure on foodstuffs and thirdly, according to the absolute figures, the expenditure on farm stock and implements and on building material. The whole expenditure on industrial products of these five regions fluctuates between 115.53 and 167.75 roubles. In the first years after the war, 1919-20, the peasant farmer spent in all 3.41 gold roubles (1). The *chervonets* rouble, it is true, has now slightly depreciated as compared with the pre-war rouble, and it is also true that the high-priced State manufactured products involve a lower purchasing power for the products of rural economy, so that the peasant farmer is thereby led to dispose of a very considerable part of his production. But if the average expenditure in these five regions on manufactured products (130 roubles) be reduced to the pre-war prices, the following sum is obtained : the index-number for agricultural products, as calculated by the Moscow Institute of Economic Forecasts, was 209 for the whole Union during the period October 1925 to September 1926, in comparison with the 1913 prices. The index for manufactured products for the same period was 257. According to pre-war prices the expenditure on manufactured products is therefore 26 roubles. Making a certain correction for the depreciation of the *chervonetz* rouble, the total for all the expenditure on these products is very nearly the pre-war expenditure, about 21 roubles (2),

The expenditure on the purchase of the products of cultivation of the land (Table II) is naturally in inverse ratio to the receipts coming in from the sale of these products. The total amounts for sales and for purchases tend to approximate to each other on the farms of from 2.1 to 4.09 desiatines, where 12.2 % of all the receipts came from the sales and the purchases represented 14.9 % of all the expenditure. On farms where the area sown was less than the above, this expenditure exceeds these receipts. " This parallelism of receipts and expenditure for the products of cultivation of the land — to quote Raevitch, who is one of the compilers of the peasant budgets at the Department of Central Statistics — does not point to any coincidence as to quantities, as it is clearly necessary to purchase at a higher price than one sells, at least when the purchasers are farms of the lower groups ".

Expenditure on renting of land and on payment of wages increases with the increase in the extent of the areas sown of the peasant farms. A large part of these payments are made in kind ; it is not possible to fix the amounts with any precision.

As regards payments of rural taxes, the table clearly shows that the smaller the farms, the lower is the percentage of tax paid. The whole assessment for all the peasant farmers has fallen from 335 million roubles in 1924-25 to 300 million roubles in 1925-26 (3). In absolute figures, on an

(1) See : *Agrarian Policy in Soviet Russia. International Review of Agricultural Economics*, No. 4. Rome, October-December 1924, p. 527.

(2) *Ibidem*.

(3) See *International Review of Agriculture*, No. 3. Rome, April 1927 (p. 288).

average, the rural tax for each farm, shown for each group, was as follows for the last two years :

	Up to 2 desiatines	2 to 4 des.	4 to 6 des.	6 to 8 des.	8 to 16 des.	over 16 des.
1924-25	9.15	17.2	24.61	33.27	48.90	94.75
1925-26	7.90	11.8	16.33	21.20	31.27	83.54

A large part of the tax thus falls on the larger farms, but even on these a continuous gradual reduction of the tax has gone on.

The enquiry into the budgets has also established data as to the ready money at the disposal of the peasant farm at the end of the agricultural year, that is on 1 April. The resources in ready money are usually at that date at the minimum, being however balanced by the winter profits from the industrial earnings. The largest sum in ready money is found in the case of the southern farms : in the Crimea (average 77.7 roubles per farm), in the Northern Caucasus (42 roubles), in the eastern part of the Ukraine (28.9 roubles). Next come the farms of the Central industrial region with 24.5 roubles, the Ukraine (right littoral) with 23.8 roubles, etc., and lastly the region of the Baschkir Orenburg with 10.8 roubles, and the Far East. The average in ready money for all the farms of the Union is reckoned at 20.52 roubles.

In 1924 the rural receipts taken all together, of the Union were reckoned at 4,348.7 million roubles, which gives an average of 43.2 roubles per head of the rural population. Before the war this return was equivalent to 54.7 roubles. The peasant farm returns for the last financial year under enquiry have not yet been established. According to indications to be found in economic literature, it may be considered that the returns from rural economy, which is slowly freeing itself from the post-war depression, are gradually approximating to those of the pre-war period.

THE SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL AGRONOMY AND TEMPERATE CLIMATE CROPS

On the Question of the Influence of Geographical Factors on the Hulledness of Barleys.

KOZLOV, V. *Trudn na prikladnoi botanike i sel'skoi* (Bulletin of Applied Botany and Plant-Breeding), Leningrad, 1927, Vol. XVII, No. 2 Pp. 169-171, 10 tables, English Summary 1 p. 172-173.

The present work is the first attempt at tracing the variation in the hulledness of barleys on the base of geographical experiments conducted all over the U. S. S. R.

The determination of hulledness, *i. e.* the relation of the dry weight of the glumes to the dry weight of the whole grain, was carried out according to the method of KEMNITZ (The Methodics of Determining the Hulledness of Barley, *Bulletin of Applied Botany*, St. Petersburg, May 1910), *i. e.* the glumes were removed with a pincette after ten minutes macerating in rarefied air in the Kemnitz apparatus.

Materials used for the investigation were the pure lines of *Hordeum vulgare*, from the geographical experiments of 1923 and 1924, as well as three races of *Hordeum distichum* from the experimental sowings of 1924 and 1925; the seeds were supplied every year by the Institute of Applied Botany of Leningrad, the experimental material being thus derived from the first year's sowing.

The averages for *Hordeum vulgare* v. *pallidum* at all stations (from 7 to 11 for each form) for the year 1924 were as follows: v. *p. irtutianum*: weight of 100 grains 2.86 gm.; hulledness 10.87 per cent; v. *p. lapponicum*, 2.99 and 11.50; v. *p. mandschuricum*, 2.96 and 14.93; the averages for *Hordeum distichum* obtained in the same year at 8 stations were respectively: v. *nutans bohemicum* 3.99 and 9.84; v. *erectum suecicum* 4.42 and 9.83; v. *nutans colchicum* 3.32 and 9.51.

The fluctuations in the weight of the grain are strictly correlated with its hulledness. The fluctuations of hulledness do not exceed 0.5 %

if the weight of 100 grains does not deviate from the average by more than 0.2 gm.

At the same time the racial difference of hulledness is considerable. According to the experiments of KEMNITZ the fluctuations of hulledness between races reach 4.5 %, while according to the experiments of HORKY and KLOSE (*Wissenschaftlich-praktische Untersuchungen auf dem Gebiete des Pflanzenbaues, Mitteilungen aus dem landw. Laboratorium der K. K. Hochschule für Bodenkultur in Wien*, Bd. II, 1877) they even reach 7.5 %

From the figures quoted, which give the averages for every race, it may be seen that the differences of hulledness almost reach 3 %, which constitutes 25 % of the hulledness of the race *lapponicum*. The peculiar hulledness which characterizes every race recurs in the following year and may be regarded therefore as a characteristic racial feature.

Thus the inconsiderable fluctuations in the hulledness of barley according to the geographical stations (Priladoga — Detskoie Selo — Petrovskoje-Razumovskoie — Butyrsky Experimental Farm — Omsk — Krasnykut — Ekaterinoslav — Tulum — Poltava — Askania Nova — Yalta — a range in geographical latitude from 59°44' to 44°32') and the considerable differences as regards the separate races admit the conclusion that hulledness of barley is a stable, hereditary character which in the first year of sowing does not respond to the influence of geographical factors.

Determination of Soil Reaction with the Merck Universal Indicator.

WIESSMANN, H. and STEINFATT K., Die Bestimmung der Bodenreaktion mit dem Merckschen Universalindikator *Fortschritte der Landwirtschaft*, Wien und Berlin, 1927, 2 Jg., Heft 15, S. 488-489.

F. MERCK's Chemical Works at Darmstadt supplies a dye stuff mixture in a drop glass with which it is claimed to be possible to measure soil reaction quickly and easily by adding two drops to the soil sample, previously placed in the hollow of a porcelain palette. On addition of this mixture the soil sample assumes different colours according to the respective reaction, so that, by means of a colorimeter, the pH value of the sample can be determined. The sample may be prepared for this purpose with water or, better, with a solution of potassic chloride.

This process for determination of soil reaction is described in full detail in this article, and the authors have submitted it to further control tests, on the one hand investigating with the MERCK universal indicator SOERENSEN's buffer solutions prepared by themselves, of which the reaction was, of course, familiar to them; on the other hand undertaking experiments on samples to which, to institute a comparison, the electrometric method was also applied.

In both of these cases the writers concluded that the pH values determined by the MERCK indicator generally correspond to the actual value determined by the electrometric method. The largest difference noted was about 0.5, but in most of the cases it was less. Exact tests cannot

of course be carried out with this indicator. If, however, absolute precision is not required (as often occurs in practice when all that is wanted is some indication of the reaction), MERCK's indicator, in the writer's opinion, is undoubtedly more convenient than many other processes which can be reliably carried out only in chemical laboratories.

The authors had occasion to observe that, when left unused for a time, the indicator took on a green colour, but they ascertained that this change of colour, which is attributable to alkaline traces in the drop glass, does not affect its utility

The Action of Sulphuric Acid on Cultivated Soil.

RABATÉ E. *Journal d'Agriculture pratique*, Paris, 1927, an. 91, t. I, n° 11, p. 215-217.

The application of sulphuric acid to the soil immediately affects the mineral or organic substances which it contains. Thus, if 150 kilos of sulphuric acid are applied to 1 ha. of land, about 200 kilos. of various sulphates of lime, iron, aluminium, etc. are formed which undoubtedly have a marked fertilising influence. The sulphates have also undoubtedly their own nutritive value and thus the fertility of lands treated with sulphuric acid can be explained.

The writer quotes examples of the increase in the grain yield after treatment of wheat and land with sulphuric acid.

(1) *Treatment of growing wheat.* — The soil was treated on 9 March with 1000 litres per hectare of a solution containing 11.5 litres of acid at 53°B per 100 litres.

	Yield in q. per ha.	
	Grain	Straw
Plot treated with acid	30.5	23.5
Plot not treated	25.0	27.0

(2) *Treatment of unsown land.* — The conditions of treatment were the same, the ground being then planted with half-sugar beets.

	Yield in q. per ha.	
	Roots	Straw
Plot treated before sowing	342	56
Plot not treated	273	43

The treatment which was given at the end of February not only destroyed almost all the charlock, but in those plots where it was most

abundant and the treatment was in consequence the most thorough, the increase in yield was also the highest.

A very interesting experiment has been made at the Agricultural Institute of the Faculty of Sciences at Toulouse, where a comparison was made on the action of different phosphatic fertilisers on wheat, treated with sulphuric acid for the destruction of wild radish.

One plot had received a top-dressing of natural phosphate in the spring and this plot showed the highest yield. Is it possible that a particularly active superphosphate was immediately formed? Fresh experiments are necessary to determine the point.

The author refers to the importance of seeing that the soil, when frequently treated with sulphuric acid does not suffer too much loss of lime. As soon as ever the necessity becomes apparent, lime and marl must be applied.

Nitrogenous Fertilizers in Italy.

ZAGRO. *I concimi azotati italiani*. 26 p. Tip. Montecatini. Milan, 1926.

A pamphlet advocating the employment of nitrogenous fertilizers. An explanation is given in popular language of the function of nitrogen, and of the requirements of cultivated plants, as well as of the method of application and the action of nitrogenous fertilizers. An account follows of the manufacture of these fertilizers in Italy, and it is stated that the production of ammonium sulphate, nitrate of ammonia, nitrate of calcium, calcium cyanamide, is sufficient for present and future national requirements. Some guiding principles are given as regards the choice of nitrogenous fertilizers and the quantity to be applied to any crop. The work concludes with an examination of the consumption of nitrogenous fertilizers in Italy. It is stated that the proportion between the consumption of nitrogenous fertilizers and the consumption of phosphatic fertilizers in Italy is 1 : 8 as compared with 1 : 1.28 for Germany ; 1 : 2.08 for Belgium ; 1 : 2.1 for Denmark ; 1 : 2.3 for Holland ; 1 : 3.9 for England ; 1 : 4 for the United States ; 1 : 4.3 for France, the conclusion being that the present consumption of nitrogenous fertilizers in Italy ought to be trebled or at least doubled.

Manurial Experiments with Potassium Nitrate.

PROWEIN, Fr *Chemischer-Zeitung*, Cöthen, 1927, Jg 51, Nr. 36, S. 341-343.

Potassium nitrate is a new compound fertilizer which has many advantages in manufacture and excellent fertilizing properties. Its physiological effect on plant growth is not yet quite determined, a fact which made further experiment desirable.

The author here gives an account of experiments carried out at the Agricultural Chemistry Institute of the Chamber of Agriculture of Saxony and at the Agricultural Experiment Station of the Cassel Chamber of Agri-

culture, where the effect of potassium nitrate was compared with that of other simple and compound fertilizers, especially with compound fertilizers containing the same amounts of potassium and nitrogen as are found in the potassium nitrate.

The manual experiments of the Saxony Research Institute were made on potatoes, tobacco, winter wheat, and sugar beet. The effect of potassium nitrate on the first two and on sugar beet was excellent in every respect, while in the case of winter wheat, due probably to slight experimental errors, the effect of the potassium was not apparent. The experiments at the Research Institute of the Cassel Chamber, the results of which, as in the above case, were given in tabular form, show that the nitrogen of potassium nitrate is similar to that of sodium nitrate in the case of winter wheat, rye, oats, potatoes, and mangels (field experiments), while in the case of oats and mustard (pot experiments) the nitrogen in the potassium nitrate was the most effective.

Finally, experiments were carried out in the laboratory by NEUBAUER's method. Here it was seen that the availability of the potash in potassium nitrate is just as good as that in potassium chloride. It is especially noteworthy that the utilization of phosphoric acid was very much greater in the presence of potassium nitrate than where other fertilizers were used.

These experiments were all of only one year's duration, and their results therefore cannot be considered as final.

High Yield Wheats in the South-West of France.

BACHALA. *La Vie Agricole et rurale*, Paris, 1927, tome XXX, n° 17, p. 261.

Notes on wheats under observation in two selection centres.

Selection centre of Villefranche de Lauraguais. — In this centre M. SERIN has studied selection on seven varieties of wheat of Italian origin, viz. : Carlotta Strampelli, Ardito, Varrone, Zara, Inalettibile, and Gentil Rosso families 48 and 58, which were tested against Hâtif inversable, Moyencourt, Bon Fermier, Besplas, G. 4, 77 (Tourneur), Précoce de Milly (GODINEAU), 38 A (SCHRIBAUX)

In 1926 the early varieties were not helped by climatic conditions. Ardito and Varrone gave a poor result when cultivated on soil of fair fertility. Carlotta Strampelli did better and gave a good return even on soil of moderate fertility. G 4 gave the highest returns.

Selection Centre of Fournes (Tarn). — In this centre M. CARLES is seeking improvement by means of hybridization and selection. Among many of the varieties examined seven have earned special attention, viz. 63 F — Besplas × Carlotta No. 08 — No. 07 — Rousselin × Bon Fermier — Inversable × Besplas — Besplas × Carlotta No. 06. The best of the series appears to be 63 F. G 4 (SCHRIBAUX) yielded 50 hectolitres per hectare

Gironde Japhet Inversable is an early wheat and seems to do well. Varrone is a late wheat.

A sort of Ardito with long straw and larger grain has been obtained by M. CARLES and called by him Ardito II. It is a little later than ordinary Ardito but ripens about ten days before the earliest native wheat.

Generally speaking it is noticed that the year 1926 was unfavourable to early wheat owing to fogs in April, etc.

Time of Cutting Wheat and Oats in Relation to Yield and Composition.

ARNY, A. C. and SUN, C. P. *Journal of the American Society of Agronomy*, Geneva, N. Y., 1927, Vol. 19, No. 5, pp. 410-439, 8 tables, bibliography.

Trials carried out at the Minnesota Agricultural Experiment Station St. Paul, Minn. in the summer of 1925.

In the northern United States and in Canada grain is frequently cut several days early to avoid the harmful effects of frosts.

Considerable attention is given in the article to previous experiments by other investigators in the past, after which the writers proceed to a detailed account of the methods used by themselves and the results reached — in as far as definite conclusions could be obtained on one year's experiments only.

Both wheat and oats were cut every day from 9 days early up to estimated full maturity. Nine days before maturity wheat was in the following condition : — terminal spikelets green, kernels in thick milk stage, 1st and 2nd 8 inches of straw green, leaves green, while oats shewed the same phenomena except that the kernels were in the thin milk stage at this period.

Discussion and tables follow, describing the individual day results and a summary concludes the article.

Subject to environmental conditions attending the experiment, the following results were indicated :—

1. Cutting wheat and oats before maturity resulted in decreased yield when the grain was cured in the shock.
2. Lower weight per bushel resulted from premature cutting, though the decrease resulting from not more than 7 days anticipation of ripeness did not affect the grade of the grain.
3. There was an increase in weight per 1000 kernels from the earliest date at which cut up to the time of cutting 3 days early for wheat and 4 days early for oats.
4. Cutting 7 days early produced many green kernels, which however disappeared entirely from wheat and largely from oats on slow curing in the shock.
5. The percentage of hulls of oats cut before maturity was higher than when cut at maturity.

6. The above points indicate that there was not much movement of materials from the straw to the grain after cutting.

7. Drying rapidly in the oven had the same effect on weight per 1000 kernels as curing slowly in the shock

8. Hull percentages in oats were also not affected differently by the two process of drying.

9. Higher nitrogen content of straw dried rapidly in the oven as compared with shock drying indicated that nitrogen moves out of the straw.

10. Oat grains from oats cut 7 days early and left in the shocks shewed an increased nitrogen content as compared with those from oats dried in the oven. No such increase was noted in wheat.

Maize and the Necessity for Crop Rotation.

WIANCKO, A. T. (Chief agronomist, Purdue University). Crop rotation in relation to the agriculture of the Corn Belt. *Journal of the American Society of Agronomy*. Geneva, N. Y., 1927, Vol. 19, No. 6, pp. 545-555.

The same problem now being faced in the American Corn belt must sooner or later arise for the vast new areas of virgin land brought under maize cultivation in different parts of the world, namely the continued maintenance of soil fertility.

Experiments on the rich prairie soil at the University of Illinois since 1876 show conclusively that continuous maize beggars the soil with increasing rapidity, that corn and oats alternating have only a slightly better effect and that even where clover is introduced into the rotation there is still something lacking. Other experiments prove that the addition of manure, lime and phosphate in the absence of rotation is unsatisfactory.

Two things are essential, adequate organic matter and adequate nitrogen. Both are more rapidly used up under corn than under small grain or hay, the cultivation given the corn crop hastening the decomposition of organic matter and increasing nitrification.

Analysis of 31 cropped and 31 virgin corn belt soils in 1913 shewed a loss in the former of 26 % of organic matter, 47 % of humus and 28 % of nitrogen.

At the moment farmers are loath to practise rotations owing to the tremendous demand for corn, which ensures at present that $\frac{1}{5}$ - $\frac{2}{5}$ of the corn belt land is always under corn, though several valuable legumes well suited to the corn belt conditions at once suggest themselves.

A solution appears to lie in the use of such legumes as cover crops or inter crops for ploughing in, especially soya beans and sweet clover. For instance, where stock is also kept, a five year rotation of corn, corn, soya beans, wheat and clover should successfully maintain good yields, cover

crops being sown under both maize crops and ploughed under, manure and phosphates being applied to the maize and a good complete fertilizer to the wheat.

A successful development of the artificial farmyard manure process would greatly facilitate the success of this or even such another simpler rotation as corn and wheat with sweet clover sown in the wheat and ploughed in before the maize, even in the absence of livestock.

A point of paramount importance is that corn should follow a legume which yields plenty of nitrogenous residue for ploughing in. For the successful growth of such legumes it is essential that the soil should not be lacking in lime nor sour for other reasons.

Trial results at the Indiana Experiment Station for the last 10 years on 10 different corn rotations, manuring being suited to each rotation, show that fertility can be maintained without detriment to, in fact, with considerable gain to fertility and profits.

A note of warning is sounded as to the practice of seeding wheat in standing corn owing to the advent of the European corn borer and the necessity for cleaning the ground from all danger of this pest after the corn crop. It is suggested that the extra labour and difficulties involved in completely cleaning corn fields will tend to reduce the corn acreage and greatly modify cropping systems.

***Trifolium subterraneum* : its Spread in Australia.**

"RISDON". *The Pastoral Review*, Melbourne 1927, Vol. XXXVII, No. 1, pp. 42-43.

Subterranean clover, originally considered as a harmless weed, has spread tremendously of late and for some years now has actually been sown as a permanent pasture plant. The Victorian Department of Agriculture does not recommend it for laying down on lands where other clovers will grow, but strongly advises sowing in poor sandy lands. In New Zealand it is sown in swamp areas along with *Paspalum dilatatum*.

Its chief defect would seem to be that it leaves the land comparatively bare in summer. On the other hand it is found that in paddocks, where it grows strongly, lambs and ewes do best, moreover its dying down in early summer limits the danger expected from fire, and it is noticeably the first clover to come away after the autumn rains. It gives good feed in the winter and spring and even when the runners become dry they are eaten with avidity. It is greatly relished by dairy stock even, as has been noticed, in preference to other more succulent types of clover.

The best method of sowing down so far has been under cereals as a cover crop. The stubble is not fed off too closely and the clover will be found to seed itself very successfully.

The amount of seed need only be very small, not more than 5 lbs per acre, provided it is allowed to seed itself the first year. Superphosphate has been found beneficial.

The Effects of Spacing on the Composition of Sugar Beets.

CHMELAR, F. ŠIMON J. and MIKOLÁŠEK, F. Přehled výsledků srovnávacích pokusů s různou vzdáleností rostlin cukrovky na Moravě v letech 1922-25, *Věstník Československé Akademie, Zemědělské*, Prague, 1927, a. III, n. 3, p. 238-241; abstract in French p. 241-242.

Experiments made by the Seedtesting Section of the Agricultural Experiment Station of Moravia at Brünn from 1922-25 with sugar beets of the two varieties "Dobrovice" and "Schreiber SS", spacing at 40-45-50-55 cm. between the rows and 25 and 30 cm. between roots in the rows. The results which are carefully set out by the writers in various tables demonstrate among others the following facts:—

(1) An increase of area at the disposal of the plant increases the weight of the root but not proportionately; thus, increasing an area of 1000 or 1200 sq. cm. by 12.5-25-37.5-50 % the corresponding general average increases over all the trials and for both varieties were 10.7-18.7-32.9-36.8 % in the weight of the root. Increased spacing in the rows produced a larger increase than the same increased spacing between the rows.

(2) Increased spacing has little effect on the ramifications of the roots and on the development of that part of the root which comes above the soil.

(3) When the inter-row spacing was increased from 40-45-50-55 60 cm. respectively, the saccharose content increased 0.12-0.29-0.42-0.60 %; that of the dry matter decreased from 0.26-0.83 %; that of nitrogen rose from 0.03-0.07 %; the actual crop per hectare decreased 1.6-5.1-4.0-8.90 %; the sugar produced per hectare decreased 2.2-6.5-5.3-11.7 %. In a quarter of the tests the largest sugar production per hectare coincided with a space of 45 cm.

(4) Spacing has little effect on the weight of the "top", which changes from 1.0-1.5 % of the total in consequence of a change of spacing from 40-60 cm.

(5) Increased spacing is more beneficial to "Dobrovice" than "Schreiber SS."

(6) The influence of the area covered by the plant on the growth and composition of sugar beet depends on a number of factors, chiefly the medium of growth and meteorological factors, and of the latter particularly on rainfall. If rainfall is scanty or badly distributed, its action

is increasingly unfavourable, the more densely the plants are set. A greater area covered allows the plants to be left growing longer and the harvesting to be done when the roots are riper and of a better composition.

(7) For such rich soils as the Moravian, the best spacing and that actually practised by Moravian farmers is an interval of 40-45 cm. between rows and of 25-30 cm. in the rows. For less fertile and more exhausted soil 45-50 cm. is a better interval to have between rows.

A 20 % cut in labour was achieved by increasing the interval between rows from 40-50 cm. Hence a 50 cm. interval may be advantageous (given that the resulting decrease in root crop or in sugar is small), especially when varieties are well selected and the land properly manured and cultivated.

Potash and Ammonia Salts on Mangels and Potatoes at Woburn Experimental Station 1926.

The Fertiliser, Feeding Stuffs and Farm Supplies Journal, London, 1927, Vol. XII, No. 8, p. 283.

a) *Mangels*. — The land which was fairly heavy received a 2nd ploughing early in April and a dressing of 9 tons per acre of farmyard manure. The artificials, except the nitrogenous top-dressing, were applied 3-5 May and the seed 8 lbs. per acre was sown 8 May. An attack of "spider" (*Collembola*) was overcome by the use of the heavy roller. Top-dressings *i. e.* $\frac{1}{2}$ the total nitrogenous fertilizer, were applied after singling on 5 July (in the case of the potatoes also given as a top dressing).

The following table demonstrates the value of nitrogen over and above that in dung, of the slight superiority of the muriate over the sulphate of ammonia and of the sufficiency of the potash supplied in the dung, on this somewhat heavy soil.

Plot	Manuring per acre	Produce of Mangels per acre	Produce of Potatoes per acre
—	—	Tons	Tons
1.	Dung 9 tons. Supers 2 cwt. K ₂ SO ₄ 1 cwt.	$\left. \begin{array}{l} \text{NH}_4 \text{ Cl} = 2 \text{ cwt} \\ (\text{NH}_4)_2 \text{ SO}_4 \end{array} \right\}$	23.25 approx.
2.	Do + no Nitrogen	17.95	5.35
3.	Do + (NH ₄) ₂ SO ₄ 2 cwt.	21.80	6.05
4.	Dung 9 tons. Supers 2 cwt. (NH ₄) ₂ SO ₄ 2 cwt.	$\left. \begin{array}{l} \text{no Potash} \end{array} \right\}$	23.15
5.	Do + KCl = 1 cwt. K ₂ SO ₄	23.90	6.30

b) *Potatoes*. — The land used was lighter than that under mangels. A good plant was obtained, two sprayings were given with Bordeaux mixture, very little disease occurred and a fair crop of good quality was obtained.

On this lighter soil the need for additional nitrogen and potash is well brought out by the figures. Again a slightly better result followed the application of NH_4Cl than that after $(\text{NH}_4)_2\text{SO}_4$.

Manuring of Early Potatoes in New Zealand.

PATTERSON, T. H. and WOODCOCK, J. W — *New Zealand Journal of Agriculture*, Wellington, 1927, Vol XXXIV, No 3, pp. 165-172.

The usual place in rotation for "earlies" is after 2 or 3 year old grass leys. Until a short time ago a ton of bone dust per acre was the normal manuring.

These experiments were undertaken to see to what extent bone dust can be replaced by supers and Ephos phosphate, both of them cheaper per unit of phosphoric acid.

The experiments were carried out on 3 farms of varying soils. The following conclusions were reached:—

(1) Bone dust can be replaced in part, sometimes wholly by mineral phosphates.

(2) Supers both lessened the cost and increased the yield in nearly every case.

(3) In presence of adequate humus, mixtures such as supers and Ephos can probably entirely replace bone dust.

(4) Increased returns from supers outweigh residual effects of bone dust.

(5) The rainfall during the experimental season was above the average. In a drier season it is thought supers would prove even more efficacious.

(6) Further experiments are necessary.

N. B. — The tilth of the soil is of such importance to potatoes that the response to manures varies greatly with thoroughness of cultivations.

Tomato Growing in the Neighbourhood of Sydney, N. S. Wales.

DOUGLASS, J. Early Tomatoes in the Metropolitan Area. *Agricultural Gazette of N. S. Wales*, Sydney, 1927, Vol. XXXVIII, part 4, pp. 329-335 and part 5 pp. 400-406, illustr.

An account of a successful experiment in early tomato growing on the 'single stem system', as practised at Hawkesbury Agricultural College, recommended by the Dept. of Agriculture of N. S. W.

Seed frames. — These were made from corrugated iron sheets $8' \times 3'6''$ the total height being something under $7'$ at the back and half that in front, the back sheets acting as a wind screen and a sun reflector. The frames faced north, the sunny quarter and were provided with blinds — makeshift affairs of sacking which were rolled up or let down as required to protect the seedlings from cold or heat. The frames were prepared by introducing into each 2 tons of *fresh* (poultry or horse) manure which was well trampled down to generate the maximum of heat. On the top was put $5''$ of virgin bush soil mixed with lime, and on this were placed boxes $12'' \times 12'' \times 3''$ filled with similar bush soil mixed with a little supers. These were packed as closely as possible, any air spaces being filled with

soil. The whole surface was then covered with a $\frac{3}{4}''$ mulch of fine-sterilized

decayed poultry manure on which was scattered seed, $\frac{1}{2}$ oz per frame. Five frames were sown, so providing enough plants for 2 acres. The seed was covered with $\frac{1}{4}''$ of soil.

The sowing was in winter and the seedlings on emerging thanks to the warmth of the bed were separated to $1\frac{1}{2} - 2''$ between plants to

encourage the growth of short stocky plants.

1st Transplanting. — This took place when the plants were $3''-4''$ high into similar frames containing only soil. A thorough saturation was henceforth given once a week and the blinds were so manipulated as to ensure adequate, not excessive, heat and protection from bad weather. A week before final transplanting they were finally removed.

2nd Transplanting. — The land used, virgin soil, was broken up in February 1926, given $1\frac{1}{2}$ tons of lime per acre, cross ploughed in early August and brought to a medium fine tilth by 2 harrowings. Stakes $6' \times 1'' \times 1''$ were set in rows $3'9''$ apart, $2'$ between stakes. They had in a previous year been used for a similar purpose and disinfected afterwards in bluestone. 10 cwt of a mixed fertilizer containing 10.7 % P_2O_5 , 2.5 % N, 7.2 % K_2O was distributed in the rows before planting out.

The operation took place in the 2nd half of August, care being taken to water well shortly beforehand and to transplant the wet clods of soil containing the plantlings direct to their new habitat. In October 5 cwt of the same manure was applied to half and 5 cwt of supers to the other half in late November.

Irrigation. — This was necessary and was done direct by pipes from the Sydney water supply by overhead spraying for about $1-1\frac{1}{2}$ hours at a time, the equivalent of $1\frac{1}{2}''$ rain. In all approx. $9''$ were so given.

Pruning. — This was done to ensure early maturity and uniform size. It began in the early stages and consisted in nipping out all the lateral growth 8 times during the growing season and at the same time binding the new vertical growth to the stakes.

Disease. — The seedlings were sprayed regularly with very weak Bordeaux mixture (1-1-20) and any appearance later of insect attack in the field by cutworms etc. was adequately met by nicotine sulphate spraying. This treatment in conjunction with the sterilization of the mulch used in the seed beds rendered the loss from disease less than 1 %.

Harvest. — Continued from 2 November onwards, the fruit being packed after grading into $\frac{1}{2}$ bushel cases (= about 24 lbs. per case) and taken by lorry to Sydney.

Varieties. — Several types of *Earlana* variety were most successful.

Crop and Price. — The crop averaged over 10 tons per acre, the majority being to hand in December when prices ranged highest. Thus average prices per case were in November 21/1 in December 22/6, in January 8/10.

The largest item of expenditure was labour and commission to agents. A somewhat astonishingly large profit was made which is not likely to be so large always.

Conclusion. — Early tomato growing in the vicinity of a large centre can be conducted without any elaborate devices, and can be made to show a substantial profit.

The Manuring of Tomatoes in England.

BRYNMOR THOMAS. *Journal of the Ministry of Agriculture*, London, 1926, Vol. XXXIII, No. 4, p. 343-346.

In South Lincolnshire many glass houses, used primarily for the production of potatoes, are devoted during the summer months to the production of tomatoes. Eight different kinds of manures have been tested on this cultivation under glass.

The best results have been obtained with the following mixtures on plots having an area of 4 square yards.

Plot No. 2 applied at the rate of 2 lbs. per square yard.

20 lb. Steamed bone flour

21 lb. Peruvian guano.

13 lb. Dried blood.

25 lb. Sulphate of potash.

20.9 lb. Sand.

Plot No. 3 applied at the rate of $2\frac{1}{4}$ lbs. per square yard.

- 25 lb. Sulphate of potash.
 33.9 lb. Dried blood.
 52.7 lb. Superphosphate.
 Plot No. 5 applied at the rate of 2 lbs. per square yard.
 25 lb. Sulphate of potash.
 51.5 lb. Fish meal.
 22.8 lb. Superphosphate.
 .7 lb. Sand.

Plot No. 2 gave far the best yield, 89.81 lb. against 86.7 for Plot No. 4.

Composition of the Fruits of *Asimina triloba* Dunal.

RIVIERE Gustave and PICHARD Georges. *Journal de la Société d'Horticulture de France*, Paris, 1927, 4^{ème} série, t. XXVIII, p. 160.

The following is the analysis of the fruits of *Asimina* picked in the botanical gardens of Tours, where this species of the *Anonaceae* family grows in the open soil. The pulp of the fruit is soft and pasty: its perfume, the amount of sugar it contains and its slight acidity make it very palatable.

The fruit is an elongated berry, yellowish and rather like a small banana. It is a native of North America.

Chemical Composition of the fruit of Asimina triloba.

Weight of a single fruit	22.39 gm.
Density	1.030
Pulp	21.79 gm.
Small fruit stones	0.60 »
Total sugar	4.27 »
Acidity expressed as H ₂ SO ₄	0.15 »
Dry matter	21.80 »
Ash	0.60 »

The Cultivation of Phormium, a new Fibre Plant, in Argentina.

Bulletin of the Pan-American Union, Washington D. C., 1927, Vol. LXI, No. 5, pp. 476-480, illustr.

Phormium especially *Phormium tenax* Foster promises to be a very successful crop for growth on the islands of the Delta, *i. e.* the islands

formed by the currents of the Paraná and Uruguay rivers at their junction with the La Plata. Phormium seems likely in the future to supply to a large extent the great demand for fibre in Argentina.

It belongs to the lily family and has no stem, the leaves being phyllodial, starting from the rhizome, 8 or more in number. With the growth of the plant the roots ramify and each ramification tends to become a new plant. This phenomenon affords the normal method of propagation.

The plant is harvested normally once in two years producing very strong leaves 10-13 ft. long and about 4 inches across.

The leaves are cut and the fibres extracted mechanically. The latter are then washed in running water, dried and hung on wires, where they are bleached and combed and are then ready for industrial use.

In New Zealand, its native country, where it is called "Flax" it has two chief uses. Thread for harvesting and ship chandlery. Attempts to use Delta phormium fibres for rope have been successful.

A hectare of Delta phormium planted from rhizomes begins to produce in the 4th year, giving then about 50 tons raw material. By the 7th year the yield should have reached 120 tons, which should produce approx. 18 tons or 15 % of fibre and tow.

TROPICAL AGRICULTURE

Native Coffee growing in the southern Toradja-lands (Celebes).

PAERELS B. H., *Agronomische beschrijving van de koffiecultuur in de Zuidelyke Toradja-landen Mededeelingen van de Afdeling Landbouw. Buitenzorg, 1927, No. 11, p. 1-86.*

A detailed account is given of the cultivation of coffee by the native population in the Toradja-lands (Celebes). The geography of the country is described, its soil and climate, the economic conditions, coffee-growing, the coffee trade and the prospects of this industry.

Almost exclusively *Coffea arabica* is cultivated. The distance is narrow, generally only 3 feet. The shading is irregular, sometimes no shade-trees are planted, sometimes only a few fruit-trees, and sometimes leguminous shade-trees (*Erythrina*, *Leucaena*, *Albizia*). The leaf disease (Gemileia) is everywhere present but does little damage. In some places much damage is done by the green coccid (*Lecanium viride*). Curing is done by the primitive "dry" method.

The total production may be estimated to be about 12 000 piculs (about 750 tons of 1000 kg.). It is difficult to give an estimate of the average yield per bahu, but it may be about 6 to 8 piculs per bahu (500 to 700 kg. per hectare).

The prospects for extension of this prosperous industry seem very good, at least as a native industry.

Physiological Experiments on the Germination of Coffee Seeds.

SCHWEIZER, Dr J *The Planter's Chronicle*, Madras, 1927, Vol XXII, Year 20, p. 209

I *Experiments on the germinative capacity of Coffee seeds.*—According to SPERLICH's theory every seed has a given individual factor which determines the future existence of the plant to which it gives rise. Accordingly a plant derived from one which produces few seeds has this character in the highest degree.

The duration of the germinating power of the seeds is determined by their vitality; hence early picked seeds have this factor to a much greater extent than late picked seeds. According to the same theory a lack of growth energy is seen in abnormalities in the plant and in its flowers.

Germination trials on coffee seeds have given the following results:—

(1) The seeds of one and the same plant may have different germination energy and different vigour.

(2) The seeds of plants showing abnormal formation (" Candle blossom", 3-seeded berries) show a marked decrease in energy and germinating vigour.

(3) The seeds of plants, which were grown in fertile (garden) soil, taken from round, normal berries have shewn in practice no difference in their germinative power nor in their vigour.

(4) The seeds of plants as above taken from fruits more or less exposed to the sun have not in practice shewn appreciable differences.

(5) The seeds of plants as in (3) contained in very large or very small berries, showed the highest degree of germinability and of energy in the small berries, but a number of weak plants result of which about one half die.

(6) Plants obtained from seed used in the above experiments showed after the lapse of a year and a half the same development, initial differences having disappeared.

II. *Experiments on the Preservation of Coffee seeds.* — Coffee seeds kept in dry surroundings quickly lose their germination energy, probably by reason of the loss of water by evaporation. If an attempt is made to check this evaporation by immersing the seeds in paraffin oil, the germinative energy quickly suffers; in the course of 2 $\frac{1}{2}$ months bubbles of gas form on the seeds and the air of the vessel where they are kept smells of alcohol. After three months preservation in this manner most of the seeds die and only 4% are capable of germination.

III. *Experiments on the Stimulation of Coffee Seeds.* — The shelling and softening of the seeds are old established methods of seed stimulation. The softening in different mixtures by POPOFF's method does more harm than good and does not increase either germinability or vigour.

Eight months plantlings derived from stimulated seed have shewn no difference from those grown from non stimulated seed. When coffee seeds have been kept for a long time, treatment with formalin ensures a high degree of germinability and vigour, but this method requires further testing.

IV. *Conclusion.* The results of the germination trials must not be considered as of general application, owing to the influence in various degrees of the following factors — climate, place of origin, time of picking, actual condition of the seeds at the time of the trial. These factors are correlated with and mutually influence one another and all affect germination.

Trial alone can show whether any useful treatment can be given to certain seeds under definite conditions with any certainty of success.

The Production of Tea in Tonkin.

BRAEMER, P. La production du thé au Tonkin. *Bulletin Economique de l'Indochine*. Hanoi 1927, an. 30, n° 185, p. 209.

The production of tea for European consumption has been under consideration in Tonkin for over 20 years, especially through the work of the Agricultural and Forestry Experimental Station of Phu-Hô.

The area at present under tea in Tonkin is officially estimated at 3,800 ha. but this figure is certainly an understatement. The principal crops

are in the Provinces of Ha-Dông, Lao-Kay, Phu-Tho and Ninh-Binh but it is found on a small scale everywhere in the middle and high regions.

The natives grow tea only for the collection of the mature leaves twice a year ; very little attention is paid to methods of cultivation and the yield is small. For the first efforts at systematic cultivation the French colonists and the Government are responsible.

One of the duties of the above mentioned Station was to ascertain the best varieties of tea suitable for growing in Tonkin and from 1925 a complete programme of research was arranged for improving native varieties, ascertaining the best methods of cultivation, obtaining the greatest good quality leaf production, and also for investigating the industrial manufacturing processes adopted in the Dutch and English Colonies in the Far East. These researches are not yet finished.

As far as has at present been ascertained it appears that on the very poor soils of Phu-Hô, tea of the Middle Tonkin race planted with a spacing of 1m. 20 × 1m. 20 or 1m. × 1m. after 5 or 6 years has given, according to the methods of cultivation, from 350 kg. to 560 kg. of commercial product per hectare. This production will further increase for 2 or 3 years before becoming stabilized.

This race is highly polymorphic and the productivity as between bushes varies considerably ; it is hoped to obtain a higher production by acclimatizing Assam and Manipur varieties and those selected in Laos and Tonkin. When the question of the production of black tea has been entirely solved the investigation of the production of green tea for sale in Northern Africa will be begun.

In conclusion, there is no reason to suppose that it is impossible to have in Tonkin in about ten years time some 10 or 12 tea gardens covering a total area of 3,000-4,000 ha. and capable of producing 2,000 tons of commercial tea annually.

The Government will assist in the formation of new tea gardens as follows :-

- (1) By the assistance of Government trained experts ;
- (2) By receiving at the Station of Phu-Hô European and native tea planters for instruction in methods of cultivation and preparation ;
- (3) By distributing at a low price the seeds of good varieties of tea ;
- (4) By continuing the researches undertaken for the improvement of methods of tea production and by organizing control measures against its animal and plant pests ;
- (5) By encouraging the formation of powerful Companies and by making grants to them of the necessary land on liberal terms.

The Sugar Production of Java in 1926.

HARREVELD J. van, Desuikerproductie van oogstjaar 1926. *Archief voor de suikerindustrie in Nederlandsch Indië, Mededeelingen van het Proefstation voor de Java-suikerindustrie*, Soerabaja, 1927. Jaargang 1927, no. 1, p. 1-23.

Figures are given of the production of the different kinds of sugar in all the different factories in Java, of the quantities of sugar produced

in the different parts of Java, the production of molasses and the destination, the production of sugar-cane on the different estates, the yield of sugar-cane and sugar per hectare from 1910 to 1926 and the total sugar-production of Java in these years, and some other figures.

It may be mentioned here, that in 1926 178 sugar-estates with factories were working. The total yield was in 1926 31 945 530 piculs (1 picul is 61.76 kg.), or 1 972 956 tons of 1000 kg. (in 1925 the highest yield ever obtained was reached, 37 237 044 piculs or 2 308 997 tons). A total of 31 945 530 piculs sugar in 1926 was obtained from 307 319 812 piculs sugarcane (18 982 076 tons). Per hectare an average of 105 660 kg. cane and 10 966 kg. sugar was obtained (per bahu 1214 piculs cane and 126.1 piculs sugar); in the record-year 1925 these figures were: per hectare 108 446 kg. cane and 12 881 kg. sugar.

The Origin of Tobacco and the Beginnings of its Cultivation.

CHLAVIER, A. (Docteur ès sciences). Les origines du tabac et les débuts de sa culture dans le monde. *Le Recueil International des Tabacs*, Paris, 1927, an. 5, n° 18, p. 191.

The cultivation of tobacco after having been localized in America has now spread all over the world and is found under both tropical and temperate climatic conditions. According to Father LABT, Jean NICOT, French Ambassador in Portugal, introduced the tobacco plant into France in 1560; from this fact is derived the word *Nicotiana* which became scientific in 1586 when the botanist DALECHAMP established the genus *Nicotiana*, which includes all species of tobacco.

According to O. COMES the tobacco introduced by NICOT was *Nicotiana rustica*, imported from Florida, while the tobacco imported from Brazil in 1550 by the monk André THEVET was *N. Tabacum*.

The Indians at first cultivated a great number of species of *Nicotiana*, and it is practically certain that several of these were already found scattered over Oceania and South-East Asia when Christopher COLUMBUS discovered America.

At a later stage *Nicotiana Tabacum* began to replace the other species of *Nicotiana* in America. According to E. ANASTASIA, *N. Tabacum* was a natural hybrid either brought about or discovered by the Indians. Its cultivation therefore dates from a less remote time than that of *N. rustica* and other species of this group, and also of that of the section *petunioides*. In the XVth century *N. tabacum* penetrated into the old world, spreading rapidly over all continents and the greater part of the inhabited islands; the cultivation of the other species was abandoned in places where they had been introduced and survived only in Asia and in Oceania as weeds.

The different varieties of *N. Tabacum*, which may be created by means of hybridization or selection may be further improved and genetics may contribute largely to the formation of new utilisable varieties suitable for different colonial soils and climates.

Direct Use of Latex.

ZIMMERMANN, A. Die direkte Verwendung von Latex. *Der Tropenpflanzer*, Berlin, 1927, Jahrg. 30, Nr. 6, S. 223-234.

The writer refers to the continually increasing importance of the direct use of latex as opposed to that of the light transportable crude rubber.

He first mentions the preservation of latex with ammoniac, the properties of the resulting product and its practical possibilities. He then deals with the use of other less important preservation methods.

Recently experiments have been carried out with the purpose of obtaining latex in a more concentrated form than by ammoniac preservation. The following experiments deal specially with this problem.

In the Utermark method the latex is centrifuged. The Revertex method seems a better one: in it the latex is transformed into a concentrated paste after the addition of protective colloids by means of evaporation.

The Vultex method is to vulcanize the rubber particles with sulphur, without any directly noticeable deterioration occurring in the latex. The Vultex also produces a dispersion of vulcanized rubber particles in unaltered serum. The Revultex method enables a concentrated paste to be obtained by vulcanization from the revertex.

The writer describes these experimental methods, the character of the resulting products and their suitability for use.

AGRICULTURAL ENGINEERING

Standardization of Agricultural Machinery and Implements.

DORFFEL, Die Normung landwirtschaftlicher Maschinen und Geräte. *Mitteilungen der Deutschen Landwirtschaft-Gesellschaft*, Berlin, 1927, Jahrg XI, II, Stuck 29, S. 735-737.

Standardization will bring order into the haphazard multiplicity of form apparent in every branch of agriculture. The aim is a well thought out production of goods with the advantage of mass production.

The writer gives some clear examples of the importance of standardization and refutes the objection that standardization leads to a definite constitutional lethargy, shewing that we are here concerned with no haphazard selection of bulk and varieties of material but with carefully reasoned choice of form, measurement and materials. Standardization is only applied to well established articles and has its boundary where further development is checked.

The writer gives a detailed account of the strides made lately. There are 400 types of machine knife blades. Standardization provides for 2 only which can serve all purposes. Other parts of the cutting apparatus of the mowing machine also need standardizing. Similarly the thresher needs standardization of those parts which wear out most quickly, namely the threshing teeth and the equipment of the drums. Standardization of the toothed harrow is already accomplished. There are only 3 sorts of harrows, a light seed harrow, a medium weight seed harrow and a heavy drag harrow. In each group 2 types of arrangement are provided. The firm of Sack, Siedersleben and Deline have produced a forecarriage for drills, which can be used also without difficulty for chaff-cutters and manure spreaders. A start has been made in standardizing the wheels of farm wagons, and this will be followed by that of plough wheels.

Finally he gives as his opinion that the most fruitful field for the development of standardization will be that of materials, *i. e.* the prescription of the exact material to be used for much used parts. This is already done in the case of knife blades for mowing machines. For a plough share a proper chemical analysis is used in making the material, and, as in the case of the knife blades above, the tempering, shape, depth and special degrees of tempering proper to the different parts are prescribed in detail.

Suction Gas Tractor Trials in England.

Tractor ploughing with producer gas. *The Engineer*, London, 1927, Vol. CXLIV, No. 3730, p. 37, 3 illus.

The Parker Producer Gas Plant. *The Implement and Machinery Review*, London 1927, Vol. 53, No. 628, pp. 430-431, 1 illus.

A trial was held at Perivale near Ealing on 29 June, 1927 of the Peterbro-Parker and other tractors of the Parker Producer-Gas Plant Company to demonstrate the practicability of using charcoal fuel on agricultural tractors and the highly efficient working now obtained by the use of high compression. It is claimed that by using some 50 % higher compression

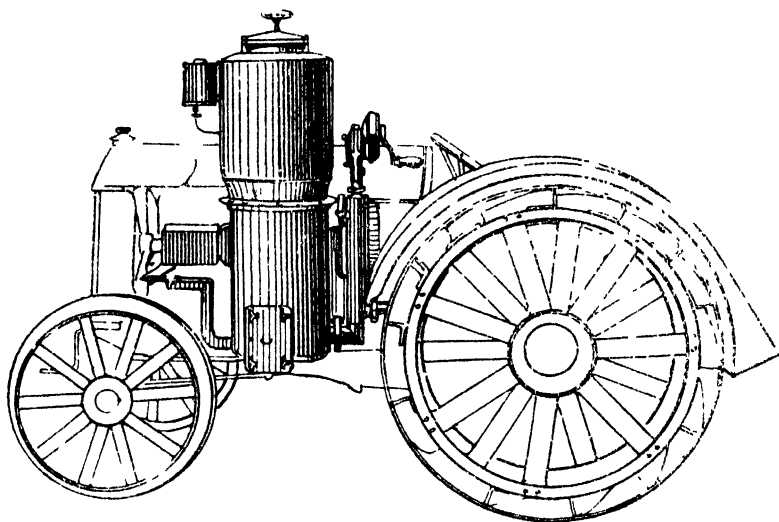


Fig. 1. Gas generating plant for use with a "Peterbro" Tractor.

sion pressures than are used with paraffin fuel the lower calorific value of producer gas is compensated for and it may be used at high altitudes.

The plough used was a three q" furrow "Howard general purpose, self-lift" plough and the average depth of the furrows which were ploughed without difficulty was $7\frac{1}{2}$ ". The engine is of the Ricardo type with four $4\frac{3}{4}$ bore cylinders and a stroke of $5\frac{1}{2}$ ". It is designed for an output of 30 B. H. P. when running at 900 r. p. m. on producer gas.

The fuel hopper is circular with a slightly sloping bottom and has a capacity of 50-70lbs of charcoal fuel, sufficient for 3-4 hours working, according to the quality of carbon and the horse power developed. The hopper lies just above the producer, which is lined with a refractory material and provided with a fire-door and ash-pan in the base, which are normally sealed by a light removable cover. Attached to the producer is a

vertical preheater of tubular construction, on the top of which is fixed a hand-driven fan. The preheater consists of an outer tube through which the hot gases are drawn and which surround an inner tube through which the supply of air is delivered to the producer. A water tank is attached to one side of the hopper, and a finely adjustable water drip fitting delivers water to the one inlet tube. On leaving the preheater the gas passes through a flexible metal tube to a scrubber, which consists of a rectangular

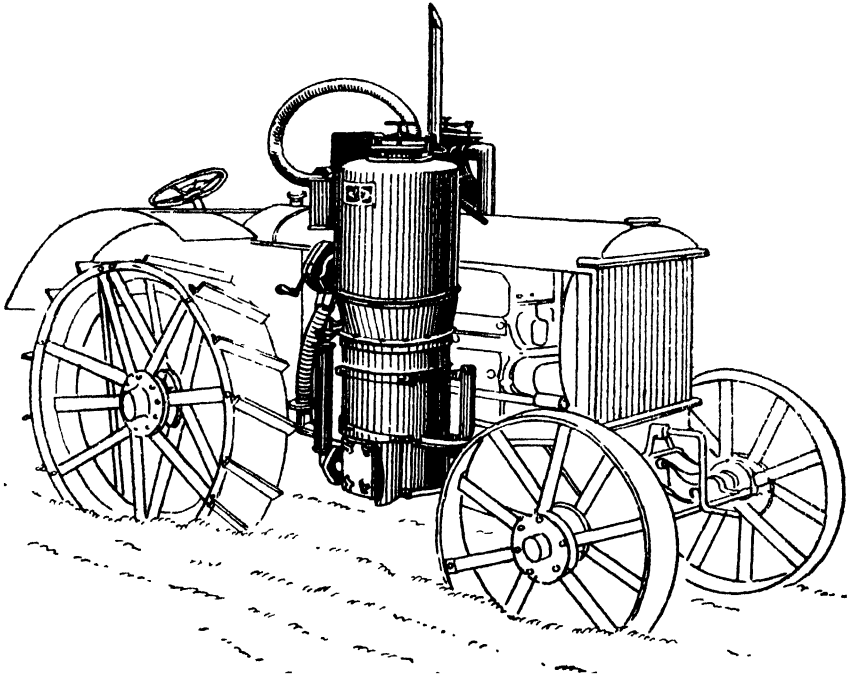


Fig. 2. — Gas generating plant for use with a "Fordson" Tractor.

box containing coke and furnished with baffles that throw down most of the dust. The gas is finally delivered through another flexible tube to a filter which is arranged near the induction manifold. This filter again is a welded steel box with an air mixer valve, which is worked by a Bowden wire control. By this means both the extra air and the gas are filtered before passing into the engine cylinders. The filter comprises an apartment filled with horse hair, also a filter pad, after which the gas is washed by passing over a water film. An arrangement for starting up on petrol is fitted on the induction manifold. The machine was ready for work 20 minutes after starting up. The fuel used was a $\frac{3}{4}$ screened charcoal.

The outfit ran very *smoothly* for over 2 hours, ploughing up many years old coarse and matted grass

A dynamometer reading of the drawbar load was not available, but superficial evidence suggested that the *drawbar pull was quite unimpaired*

The engine is said to keep as clean on suction gas as on petrol

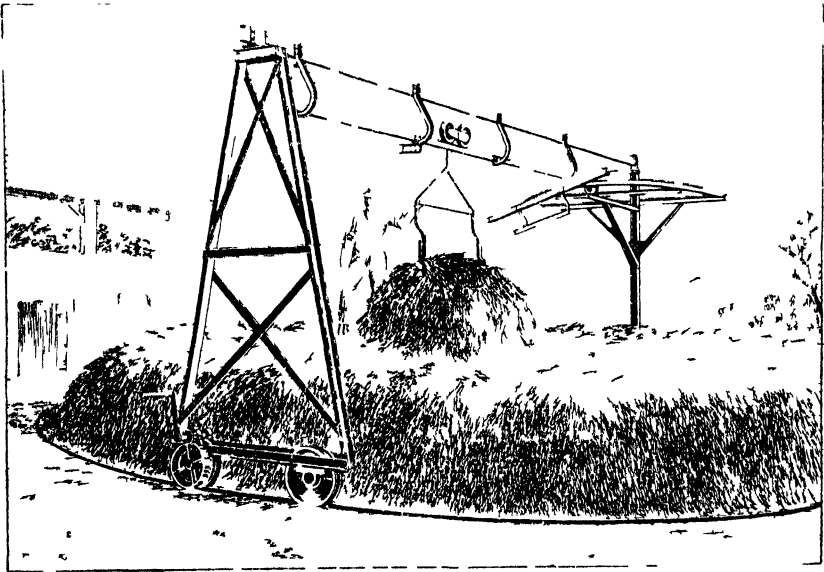
The same firm, the Parker Producer Gas Plant Co. Piccadilly London, have devised a plant for use with the 'Fordson' tractor

Stable Manure Transporter.

Landmaschine Berlin 1927 7 Jahrg Nr 12 p 185 187

We give an illustration of a device which enables the transport of stable manure in a flying wagon and its deposit on any required point of the midden

It will be noticed that the discharger consists of a rotating bridge



Stable manure transporter

one of whose ends is set in a carrier which rotates on a circular rail while the other pivots round a vertical axle

A switch allows the wagon coming from the table along the flying rail to pass on to the rail of the rotating bridge

The apparatus gives promise of success. It is made by the Maschinenfabrik THIER and MAIWALD of Glitz

A Rapid Process for Stubble Sowing.

MIX II Expresseverfahren für Stoppeleinsaat *Illustrirte Landwirtschaftliche Zeitung*. Berlin, 1927, 47, Jahrg. Nr. 26, S. 344.

The author gives an account of a very ingenious and simple method of combined labour which he has put in practice already with good results. It consists in a combination of two farm processes: removal of the stubble and sowing of a second crop (*c. g.* for green manuring).

In place of the fore-carriage of a seed drill a disk harrow is fixed for the purpose of removing the stubble. The usual width of the seed drill is reduced to the width of the plate harrow (about 2.50 m.) by putting out of action the outer drill pipes. To increase the weight of the harrow the driver sits on the machine and sacks of sand are added. Behind the machine a heavy iron chain is stretched which covers up the seed as it is sown.

During the experiment carried out by the writer in practice on this method, the above combination of disk harrow and seed drill followed closely on the reaping machine, while between the two machines there walked six labourers who moved away the sheaves left by the machine with pitchforks so as to leave way for the passage of the seed drill which was 3 m. in width. Neglect of due care in this work would lead to loss of grain. Behind the seed drill followed the labourers who stooked the sheaves over the freshly sown seed ground. On the farm on which the author carried out this experiment this last part of the work was done as piece work, whereby a lower wage was paid for wasteful work and the cost of any necessary subsequent hand digging was deducted from the total pay, a fact which conduced to clean work.

The work done on this system proved to be thoroughly satisfactory from the standpoint of quantity and, apart from the great saving of labour effected, the method has many other advantages: between the reaping, the first ploughing and the drilling in of the seed there is no injurious lapse of time during which the soil may become crusted and dry under the rays of the sun.

The subsequent trampling of the field by cultivation and drilling is thereby avoided. This sowing on the stubble benefits by favourable conditions for germination resulting particularly from the retention of the soil moisture and the friable soil condition.

It is the intention of the writer to extend the use of his method to motor traction in connection with an Institution for research into agricultural labour (Institut für Landarbeitsforschung). A combination of the plate disk harrows with seed drills already exists in the form of certain German and American apparatus, but the process suggested by the writer makes the purchase of new machinery unnecessary, since disk harrows and seed drills are already to be found on most farms. Besides, in the case of the combined apparatus referred to, the capacity of the seed box is too small. As moreover the seed box fixed above the machine constitutes the method of weighting the harrow, it is obvious that as the box becomes lighter

with the passage of the machine over the field, the furrows will become shallower and the depth at which the seeds are buried will not be sufficient.

The " Rapid " Reaper.

SAMPIETRO G Prove di motofalciatura nel Vercellese. *Il Giornale di Riscoltura*, Vercelli, 1927, v XVII, n 7, p 115-117, 1 fig.

The writer describes the " Rapid " Reaper, invented by Dr. Ugo SAVOIA, which underwent successful trials at the competition of the Vercelli Rice Growing Station and is already fairly well known in Lombardy. It is driven by an internal combustion engine either on petrol or, more economically, on heavy oil. The cutting bar is in front, generally lying on its support, on which is mounted the device for controlling the blade; behind are the movement controls; the wheels are independent and allow, by the device of one being placed eccentrically, the machine to be turned in its own length at the end of each run. The machine can also be used on sloping ground. There is no necessity for any previous marking out by hand. A " Rapid " can reap 3 ha. a day with an average expenditure per hectare of about a half of that experienced with horses and about a quarter that with hand labour. It can also serve for other purposes such as cutting and turning hay and pulling small ploughs. It may also be used as a motor for driving pumps, small batteries, etc.

ANIMAL HUSBANDRY

Cod Liver Oil as Food. Observations on the Existence of Vitamin E.

NELSON, V. F., JONES, R. L., GEORGIAN ADAMS, ANDEREGG, L. T., *Industrial and Engineering Chemistry*, Washington, D. C., 1927, Vol. 19, No. 7, pp. 839-844.

Rats were fed on synthetic rations containing casein, salts, yeast, dextrin and cod liver oil, the last being administered (1) separately, in which case the power of reproduction was badly upset, or (2) added fresh daily to the rations, when reproduction was normal, or (3) added in kilogram lots to the ration, when owing to decomposition of the oil either with consequent toxic products or destruction of the vitamins, or both, reproduction again suffered. Trial was made in (2) of substituting filtered butter fat for cod liver oil with bad effects on reproduction.

The writers stress the following results of their investigations:—

1. Reproduction results obtained with cod liver oil depend on the method of its administration.

2. Reproduction is much better on synthetic diets containing cod liver oil than on those containing filtered butter fat. If the animals in the latter case have a low haemoglobin content (as may be the case) whereas those on cod liver oil have a normal erythrocyte count and haemoglobin content, then there is present in cod liver oil a specific vitamin which is required for normal iron metabolism. This conclusion is based on the correctness of experimental results of HART, STEENBOCK, ELVEHJEM and WADDELL, namely that their animals suffering from anaemia received sufficient amounts of vitamins A, B and C, and that ultra violet light did not remedy the condition. The problem is now under investigation in the laboratory.

Number of Animals necessary in Feeding Experiments for the Elimination of Individual Influences.

MONMIREL M. (President of the Departmental Agricultural Office of Seine-et-Oise). Some agricultural work of the Agricultural Office of Seine-et-Oise *La Lait*, Lyons, 1927, a. 7, v. VII, n. 63, p. 241-256, 15 tables.

The writer gives the results of the work of the Agricultural Office of Seine-et-Oise and in a preliminary paper shows, on the basis of the mathematical theory of combinations, that no serious feeding experiments

should be attempted except with a sufficiently large number of individuals.

In fact, by using sets of 6 cows the mean observation error due to individual variations is considerable, since in 48 cases out of 100 it exceeds $\pm 2.5\%$. With 9 animals the distribution of the mean deviations is much more satisfactory, since only 21% of these deviations exceed the limits $\pm 2.5\%$.

In conclusion, it is not wise to undertake feeding experiments on milch cows with a smaller number than 5 or 6 in each lot. Moreover, as it is essential for these tests to arrange for two sets of animals as much alike as possible, one of which is intended to serve as control while the experimental ration is fed to the other, it is impossible to do serious work of this kind unless the necessary 10 or 12 animals can be selected out of a herd of at least 30 beasts; it is in fact difficult to find animals of the same age, weight and in the same condition of lactation unless a sufficient number of individuals are available.

Digestibility and Feeding Value of Corn Stover (maize) Silage.

Farm Implement News, Chicago, Ill, 1927, vol. 48, No. 25, p. 23.

In Bulletin 291 of the University of Illinois Agricultural Experiment Station, Urbana, an account is given of a study of the digestibility and feeding value of corn stover silage (stalks, leaves and husks, or what remains of the plants after the ears have been husked out).

The utilization of this by-product by pasturing in the fields is wasteful and often damages the soil by causing puddling. Large portions of the ordinary stover or shredded stover are woody and unpalatable and consequently are wasted. Studies have been carried out in order to avoid this waste by means of silage in which it is shown (by a determination of the apparent digestibility and metabolizable energy) that: (1) no considerable change in chemical composition is brought about by ensiling corn stover; (2) the availability to ruminants of the nutrients in corn stover silage is practically the same as that of nutrients in ordinary corn stover; (3) there is about 85 per cent as much total digestible nutrients in stover silage as there is in the same weight of whole corn silage (ears included), although experimental feeding trials at the Station of Urbana on beef cows indicate that the former has only about two-thirds of the feeding value of the latter; (4) the advantages of feeding stover silage over ordinary stover from the shock or pasturing in the fields are: (a) reduction of loss of material from exposure to rain and wind; (b) no loss due to trampling; (c) an increased palatability, causing a greater consumption and smaller waste in feeding, due to the fact that stalks have been softened, broken up, made juicy and palatable; (d) a much greater ulti-

mate utilization of the nutrients ; (5) the ensiling of stover offers a method of utilizing the by-products of corn culture in an effective and economical way without limiting the utilization of the main product, viz., the grain.

Feeding Tests regarding the Nutritive Value of an oily Ground-nut Bran.

MONMIREL, M. Quelques travaux de l'Office agricole de Seine-et-Oise. *La Lait*, Lyons, 1927, a. 7, v VII, n. 65, p 340-352, 10 tabl.

Ground-nut bran, which is greasy to the touch and has the same odour as the cake, is a residue of the manufacture of extra white ground-nut cakes ; this bran consists of the outer pink-coloured integument of the ground-nut, mixed with fragments of the kernel, but not including any remains of the pod. The object of the experiment described was to determine, by feeding tests, the practical nutritive value of this product compared with that of a cake mixture.

The 10 animals intended to form the two experimental lots were selected from a herd numbering 89 milch cows of which 49 were in full lactation ; these 10 animals were chosen in such a manner as to correspond in pairs, at the commencement of the tests, as regards weight, age, state of lactation and milk and butter productivity.

Throughout the experiment the milk yield was tested daily while the butter test was taken every third day only.

The testing of variations in weight of the animals was effected by the method of three successive daily weighings.

During the preparatory period the 10 animals got the same quantity of mangolds + meadow hay + molasses food while the ration of cake varied from 1.5 to 5.5 kg according to the state of lactation.

Experimental period :— during the 1st sub-period, the cows of the control lot continued to receive the previous ration ; for those of the experiment lot the substitution of ground-nut bran for the cake mixture was made in 3 days. During the 2nd sub-period, the quantity of ground-nut bran was increased by 0.2 kg. on the average, per head.

Final period :— including 7 days of transition regimen to bring the cows of the experiment lot gradually back to the ration of the control lot ; then 38 days during which the animals of both lots were again given the same feeding, identical with that of the preparatory period. Analyses made in the course of the experiment made it possible to calculate the real nutritive value of the feeds consumed by the animals. The results recorded seem to point to the following conclusions :—

(1) Milch cows can tolerate, without any bad effects, large doses of ground-nut bran amounting to as much as 5.5 kg. per head.

(2) At the market price at the time of the experiment, ground-nut bran costs, for an equal food value, 15 % less than cake.

(3) Regarded as an energy-producer it may be admitted that the forage-value of ground-nut is such that it requires 1.2 kg. of the product to replace 1 kg. of cake.

(4) The use of ground-nut bran as the sole concentrate in the ration of milch cows is not to be recommended, as a slight decrease in the milk yield may result accompanied by a considerable reduction of the butterfat percentage.

Test of Hydrocyanic Acid in Cattle Cake.

MOUSSU, G. Intoxications chez le mouton. *Résumé de Médecine Vétérinaire*, Paris, 1927. v. XIII, n. 1, p. 5-8, 1 fig. full page

Consequent on numerous cases of sudden mortality without apparent cause observed in a flock of sheep, mostly lambs, the writer was able to detect in the cakes given to the animals the presence of much linamarine, a cyanogenous glucoside, which is found especially in imported cattle cake and more rarely in the home product. He describes a simple process by which it is possible readily to detect the presence in foods and industrial residues of products which generate hydrocyanic acid.

It is sufficient to soak the suspected product in tepid water at 35-38° until it has a pulpy consistency. a test-tube is half filled with this pulp. A strip of micro-soda paper (blotting paper plunged first of all into a concentrated aqueous solution of picric acid, then dried and immersed in a 10 % solution of carbonate of soda and again dried) is placed in the upper half of the test-tube and kept in place by the cork only. After 12 to 20 hours at ordinary temperature or after 5 to 6 hours at stove temperature, the glucoside is decomposed and the hydrocyanic acid is set free, producing iso-purpurate of sodium which colours the soda paper red, more or less intense according to the richness in glucoside which generates hydrocyanic acid of the product under suspicion.

This is accordingly an excellent means of making sure that any given linseed cake may be safely used in this particular respect.

Minimum Mineral Requirements in Cattle.

THEILER, A., GREEN, H. H., du TOIT, P. J. (Division of veterinary education and research, Union Dept. of Agriculture, Pretoria, S. Africa). *Journal of Agricultural Science*, London, 1927, Vol. XVII, part III, pp. 292-314, 6 text figs., illus., bibliography.

The above authors have for many years carried out work on phosphorus deficiency on S. African pastures, see "*Phosphorus in the Livestock*

Industry " published by them in May 1924, and their aim in subsequent experiments, of which they give an account, has been the determination of the minimum needs of growing cattle for Ca, P., Na, K and Cl, attention being mainly directed to the possibility of experimental production of clear clinical cases, of " aphosphorosis ", but also subsidiarily to the question of mineral ratios in dietary and of vitamins.

After touching on the old theory that the ratio of mineral constituents in a ration matters little provided the total amount of each essential is adequate, and the new one, which would seem to be implied by MAREK in his recent papers "*Alkali-Alkalizität*" and "*Erdalkali-Alkalizität*" that the ratio is of dominant importance and may be responsible for nutritional disorders even if each constituent is singly present in sufficient quantity, they give a detailed account of their experiment.

The experiment was carried out on year old heifers in open stalls, each animal receiving a few hours exercise daily in bare courts in brilliant sunshine, so eliminating any " irradiation factor ".

The basal ration to which additions were made was as follows :—
3 1/2 lbs. hay, 2 oz blood meal and 5lbs " Fanko " (a cereal flake breakfast food extremely low in minerals) thus affording each animal daily :—

Constituent	CaO	MgO	K O	Na ₂ O	P ₂ O ₅	Cl	SO ₃
Grams per head .	6.9	6.5	24	14	5.1	9.8	11.1

The most striking results were seen in the case of cattle receiving this basal ration without the addition of any bone meal (the form in which phosphorus was added) where " Styfsiekte " (= stiff sickness) gradually developed and ended in death.

The effects of withholding Ca, Na, Cl, K and of supplementing the vitamin content are also discussed and the following points are brought out in the summary.

(1) Minimum requirements for growth are higher in the case of P than in that of Ca and a ratio of P₂O₅ : CaO : : 3 : 1 is not necessarily disadvantageous. 2 gm. Na₂O per day are more than enough for growth. Cl requirement are 5 gm. A relatively high K : Na ratio does not produce specific disease. There is no good reason to suppose that excess of basic over acidic constituents is necessary in a dietary.

(2) In the case of phosphorus deficiency definitely abnormal calves may be born.

(3) " Aphosphorosis ", or clinically recognizable phosphorus deficiency disease can be experimentally produced and is the same as the naturally occurring South African " Styfsiekte ".

(4) The chemical composition of milk of animals with this illness need not be abnormal, though the " inorganic phosphoric " fraction of the blood may fall 75 % before clinical diagnosis is possible.

(3) Exogenous requirements of cattle for vitamins A, B and C are covered by a few pounds of poor quality roughage and so do not enter into consideration under any natural system of cattle rearing.

Influence of Horsetail (*Equisetum palustre*) on Milk and its Fat Content.

DIBBERN H. and EICHSTAEDT A. Der Einfluss des Sumpfschachtelhalms (*Equisetum palustre*) auf die Milch und das MilCHFett. *Milchwirtschaftliche Forschungen*, Berlin 1927, 4. Band, 1. und 2. Heft, p. 84-93, 7 tables, 3 diagrams.

The writers have conducted feeding experiments with *Equisetum palustre* with a view to studying the influence of this plant on milk composition and milk fat. Four cows were used and the trial was divided into 3 periods :--

Preparatory period : food given was per head per day : tares ; ground nut cake 0.5 kg ; palm nut cake 0.5 kg. ; coconut cake 0.5 kg. ; wheat chaff 0.5 kg. ,

Experimental period : tares were replaced by grass containing considerable amounts of horsetail, the rest of the ration remaining unchanged ;

Final period : rations were the same as in the preparatory period.

The milk was examined daily to determine its fat content, specific weight, total solids, refraction, lowering of point of congelation, degree of acidity and coagulation capacity. Once in each period the ash, total albumin, casein, lactose, chlorine, phosphoric acid and calcium were determined.

The feeding experiments allow the following conclusions :— Feeding a fodder rich in *Equisetum palustre*, induces a decrease in milk production, while the fat content and the total solids increase.

The simultaneous decrease in solids not fat is remarkable ; in one case the content found was as low as 7.36 %. Prolonged feeding with fodder rich in horsetail leads to a fall in the degree of acidity from 7.2-4.93 ; the congelation point of the milk moves from $\Delta \times 10^{-2} 56.34$ to $\Delta \times 10^{-2} 57.69$. The coagulation capacity decreases.

The distribution of the fat undergoes a change in favour of large fat globules.

The REICHERT-MEISSEL, POLENSKE and KÖLLSTORFER indices fall. The Iodine index on the contrary and the refraction rise to a remarkable extent. The fusion and the congelation points become indirectly proportional, a most abnormal occurrence.

The action of *Equisetum palustre* on the degree of acidity, the congelation point, the coagulation capacity, the iodine index and refraction persists and continues long after the restoration of normal feeding.

Trial of the Application of the 6-5-8 Method for Determining Milk Yield.

SAIZ L, La Producción láctea y el sistema 6-5-8. *La Industria pecuaria*, Madrid, 1927, a. XXVIII, nº 618, p. 486-488.

The so-called 6-5-8 method for determining milk yield consists in measuring the milk produced on the days 6 weeks, 5 months and 8 months after calving. The production of these 3 days is added together and the total multiplied by a hundred, the product giving the number of litres of milk produced in a lactation year. The writer tested the process at the "Granja provincial" of Fraisoro on 10 cows coming from different parts, of different ages and periods of lactation, obtaining respectively the following annual productions, firstly measured accurately and secondly by calculation, as follows: 4371 and 4250 — 3238 and 3050 — 4767 and 4450 — 2269 and 2300 — 2903 and 2900 — 1966 and 2350 — 2775 and 2700 — 3721 and 3950 — 4923 and 4200 — 6820 and 7400 litres. The writer considers the approximation adequate for many practical purposes and advises the adoption of the method where daily direct measuring is impossible.

Kemp as a serious Defect in Wool

FRASER-ROBERTS J. A. Animal Breeding Research Depart. University of Edinburgh. *Bulletin of the National Association of Wool Manufacturers*, Boston, Mass., 1927, Vol. LVII, No. 3, pp. 345-367, 8 plates, 2 tables.

The recognition of the presence of kemp and of its amount is easy in particular cases, but a satisfactory definition distinguishing it from other fibres is not so simple.

The writer considers that an acceptance of the theory that kemp is a remnant of the primitive protective coat serves to link up into an ordered whole what would otherwise be a somewhat disconnected and puzzling series of facts.

Kemp examined by the naked eye shows the following characteristics as compared with other fibres:— shortness, coarseness, waviness, dead white opaqueness due to large amount of air contained, exhibition of flattened deformed portions or "breaks" and of sharp bends, flatness, low tensile strength, tendency to pigmentation where exists any tendency in this direction, a whip-last tip and at the base a thin portion terminating in a little bulb showing that the fibre has been shed from its follicle.

Microscopically viewed kemp fibres show a relatively very large medulla and a very thin cortex, the whole being surrounded by cuticular scales.

Kemp differs in its growth from the ordinary wool fibres. The latter normally grow continuously and, if shed or becoming thinner, do so at a definite time in spring, while the kemp is shed in early autumn and is definitely annual in its growth.

The percentage of kemp by weight in the writer's series of Welsh fleeces varied from 0.1 to 20, biological and technical opinion of what constituted kemp agreeing extremely well.

It would seem from trials hitherto made that any correlation between the amount of kemp present and the variations in the characteristics of other fibres is very slight.

New-born lambs however of many breeds possess a characteristic hairy outer coat, which is of great value to mountain breeds, and an attempt to eliminate kemp in a breed where this coat showed much variation might possibly injure the hardiness of the breed by multiplying a type of lamb in which the birth coat is poorly developed. The existence of correlation between kemp and a hairy birth coat still needs investigation.

In certain breeds where wool is of secondary importance coloured fibres occur. These are normally kemp fibres.

It is not yet known whether it is possible for one and the same follicle to grow kemp and other fibres at different times. The indications are that the follicles may not be specific in this respect.

The most effective way of kemp elimination would be to select rigidly against the outer coat in all its forms, whether hairy birth-coats, fleece kemp, or face hair and against all colour. If for various reasons such as preservation of breed characteristics etc. this is not feasible, the only counsel that can be given is to select for a minimum of kemp while preserving the above features.

The "churra" Sheep of Spain.

FRAILE F. La oveja churra. *El Progreso agrícola y pecuario*, Madrid, 1927, y. XXXIII, n. 1493, p. 515-516.

The writer recommends the diffusion and selection of the decidedly profitable "churra" breed. It is especially a milk breed, suitable for making cheeses, the hard Mancha type and the soft type of Villalón and Burgos. Where, as in the Segovia Sierra, only poor pasturage is procurable, it is of small size and not very striking appearance, but always very profitable owing to the very small cost of keep. On the other hand, where it is well fed and selected with care it promptly responds with increased production and good transmission of acquired

qualities to its young; this has been ascertained at the "División agropecuaria de Experimentaciones" of Palencia, where this breed has now been continuously selected for 15 years.

Function of Small Stones in Poultry Nutrition (1).

MANGOLD Dr. E. Die Bedeutung von Steinchen und Sand im Huhnermagen. *Archiv für Geflügelkunde*, Berlin, 1927, I. Jahrgang, Heft 5, p. 146-152. Bibliography.

The writer has determined that the number of contractions of the gizzard does not decrease after being cleared of the small stones which it contains. The secretion of gastric juice is not influenced by the presence or absence of hard objects in the gizzard. The presence of sand and small stones allows poultry to derive more benefit from their food when this is based on grain. Small pebbles cannot take the place of the necessary mineral substances, as they break down much too slowly with the exception of mineral substances containing lime which are slightly soluble.

(1) See this Review 1926, No. 4, p. 952 (*l.c.*).

AGRICULTURAL INDUSTRIES

The Composition of Flaked Maize.

WOODMAN H. E. and STEWART J. *The Journal of Agricultural Science*, London, 1927, Vol. XVII, Part 1, pp. 60-61.

Flaked maize is produced on an industrial scale by the steaming and rolling of maize grain; it is highly digestible and of high feeding value. Comparative analysis of five different brands gave the following results: Crude protein 10.53 to 11.24 per cent. — true protein 9.83 to 10.96 per cent. — ether extract 3.92 to 4.97 per cent. — N-free extractives 80.89 to 81.86 per cent. — crude fibre 1.59 to 2.06 per cent. — ash 1.05 to 1.42 per cent. — lime nil or trace — phosphate (P_2O_5) 0.45 to 0.81 per cent.

The moisture content of the samples displayed considerable variation, ranging from 6.61 to 14.43 per cent. The authors strongly recommend that the final process of drying the flakes should be so regulated that the moisture content at the time of weighing into the sacks should always have the same value. A 1-cwt sack of flaked maize would then always contain the same weight of dry matter and this would be unaffected by moisture taken up during storage or transport.

Drying of Sugar Beet Crowns. Desiccators for Agricultural Use.

Über landwirtschaftliche Trocknungsanlagen. *Zeitschrift des Österr. Ingenieur und Architekten-Vereins*, Vienna, 1927, a. 79, n. 25-26, p. 254.

On the invitation of the Vienna "Klub der Land- und Forstwirte" Ing. HEYDEN of the "Oesterreichische Ramag-Buttner Werke A. G." called a conference on the drying of the leaves and crowns of sugar-beet. A short report of the conference is given in this article.

Dry beet leaves and crowns form a food of nutritive value equivalent to that of an equal weight of medium quality oats. The practice of drying them artificially has not as yet penetrated into agriculture owing to the difficulty of finding a drying apparatus which will give economic results for a medium sized estate.

In order that the beet leaves and crowns may preserve unaltered their nutritive value, the apparatus must satisfy the following conditions:

- (1) complete removal of sand and soil by washing the matter to be dried,
- (2) uniform cutting and simultaneous draining off of the water adhering

to the substance ; (3) drying the cut material and leaving the nutritive value unaltered.

The time during which such a drying machine can be used is short, hence it must be capable of dealing with other products also such as potatoes, rape, chicory, cereals (put in sheaves in wet seasons), beet seeds, etc.

It is interesting to consider how far the different models fulfil these requirements.

(a) Driers of the horizontal, tower, column, rotatory pattern : here is used a system of shutters down which runs the wet grain shaken from above ; a current of warm air runs between the walls in an upward direction. This model is useful for cereals but not for more watery substances ; (b) Driers where a small stove is used with an arrangement of gratings or sieves ; the dry air or the combustion gases pass between the layers of the material which is stretched on gratings or sieves and subjected to shaking : this too suffers from the difficulty of feeding continuously ; its output compared with the cost of the fuel is small and therefore it can only be of use in small businesses ; (c) Ribbon driers ; these allow continued work but the question of air circulation is difficult and frequently the result is only a somewhat useless surface drying ; the output is insufficient, chiefly because only low temperatures can be used ; (d) Bucket or stirrer driers : the material is put in receptacles, usually closed, and is then stirred, the stirring in the closed vessel often doing harm to the material ; (e) Roller-driers ; the material to be dried is reduced to pulp, and runs in thin sheets over the cylindrical face of the roller, which is heated by steam kept circulating inside, and is removed by knives in flake form ; (f) Drum driers : the substance is moved in the same direction as the hot air ; the inside of the drum should be so constructed as to allow the maximum load (about a third of the drum's capacity), the minimum rotation speed and the simple regulation of the final stage of drying even when initial humidity is very high. Since the substance to be dried moves slowly and almost without attention, the dry product keeps its original structure excellently. The process is continuous and the temperature curve is also very regular, the greater the difference between the temperature at entrance into and exit from the drum, the more satisfactory is the use of the fuel. Other advantages are ease of movement, manipulation, cleaning and disinfection. The drum drier also lends itself to the drying of lignites and has therefore been installed in many parts of Austria with excellent results.

Carbon Dioxide as a Substitute for Ordinary Ice.

VILLERS, R. L'anhydride carbonique succédané de la glace hydrique
La Nature, Paris, 1927, n° 2761, p. 458-460, 2 fig.

Many places are without ice. Moreover its transport is difficult and troublesome and the loss by melting may vary from 20-80 %.

The use of ice (generally encouraged by its low price) is subject to the following drawbacks :—

(1) Dilution of drinks to which directly applied ;

(2) The temperature must be kept at 0°C , unless a freezing mixture of salt and ice is made, with its well known corrosive action on ordinary metals.

Liquified CO_2 is a freezing agent capable of replacing ice. Every kg. of CO_2 can liberate 50 frigories, provided it is allowed to boil at 10 and 30° . The steel containers weight 2 kg., 250 per kgt. of liquid CO_2 carried. No loss is experienced in transport however long.

The utilization of the cold necessarily produces carbonic snow as the result of expansion. The use of this snow (very common in the laboratory) allows very low temperatures to be obtained, even -70°C being reached

The writer describes the "Frigo-gaz" apparatus for the easy production of carbonic snow, the freezing effect of which is brought about through the walls of the plunger tube E, which lies in the liquid to be cooled. The level of the liquid must be kept 1 cm. below the exit

Fig. — 2 Frigo-gaz expansion organs.

slit for the expanded gas D.

The CO_2 enters at A, passes through very fine openings O, and can make its way to the exit of the expansion chamber C in the very restricted interval which separates the central cone from the concave piece B. The expanded gas can then pass out in D, after a very tortuous journey, thanks to three concentric cylinders which can slide on one another.

The use of this special gas expansion apparatus is recommended for household use

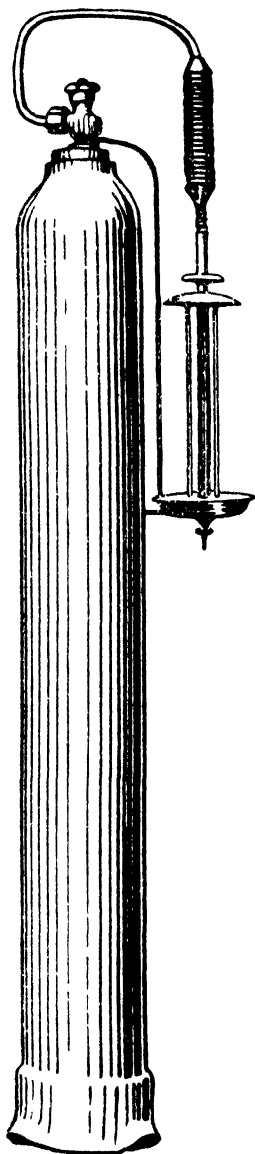


Fig. 1. — A Frigo-gaz Carbon dioxide containe..



It if became general, it would allow a great impetus to be given to the manufacture of CO₂.

Certain By-Products from the Sugar Industry, their Production and Use in South Africa.

DYMOND, G. C. *The Planter and Sugar Manufacturer*, New Orleans, La. Vol. LXXIV, No. 1, pp. 3-5.

A concise article on the possible by-products of the sugar industry.

Alcohol. — From ARNSTEIN's figures that 100 gallons of molasses will produce 40 gallons motor fuel it is calculated that about 5 ½ million gallons of motor fuel are annually available in this country. The advantages and disadvantages of the fuel are discussed. There are many research problems still to be solved, the solution of which will eliminate most of the present disadvantages.

Carbonic Acid gas. — 100 gallons of molasses will yield 300 lbs. CO₂. The use of CO₂ is increasing rapidly and at present it is used chiefly for carbonating beverages, refrigerating, fertilizing purposes, conservation of fruits, etc.

Yeast. — 100 gallons of molasses may be made to produce 50 lbs. of fodder yeast or 400 lbs. of baker's yeast. As an article of human consumption yeast is yearly increasing its range, moreover, judging from present progress in Germany, it seems likely that the solution of the problem of nitrogenous fodder production will be found to be in yeast.

Dumder and waste waters. -- The treatment of these in various ways such as the burning of the former or filtration of the latter allow the production of valuable fertilizers.

Press Cake. — In 1926 11 factories produced 78.152 tons of press cake amounting to 5.10 % of the cane produced. These figures include those for defecation press cake, the chemical analysis of this latter cake dried showing 1.06 % Nitrogen, 3.13 % Tricalcic-orthophosphate, 63.3 % total organic matter.

It is suitable for light sandy soils applied at the rate of 6-8 tons per acre. Its previous lack of popularity has been due to its slowness of action due to high wax content.

Cane wax. — Reserved for a future article.

The Manufacture of Cheap Packing Materials.

SESTINI, B. *Preparazione d'imballaggi a basso costo. L'Industria*, Milan, 1927, V. XL1, n. 12, p. 217-218, fig. 4.

The present methods of making various cardboard boxes for the transport of agricultural produce, food stuffs, chemicals etc. are tedious and expensive. The "Papyroplast" process produces economic holders

of compressed cardboard, made in one piece of different thicknesses from ordinary paper pulp or from wheat or rice straw, reeds, esparto grass, etc. without first making cardboard sheets.

The pulping is done in ordinary flat or rotatory machines; the pulp is then pressed between two moulds of the dimensions required for the holder. The far end of the mould is permeable and allows the filtration of the water, which holds 1-2 % of pulp, and so causes the fibres in the pulp to entwine with and stick to one another. This is a real felting process.

The possible thickness varies, depending on the interval, internal and external, left between the two parts of the mould and on the time in which the water is run off.

When the desired thickness is reached, the convex part of the mould is lifted, the moulded object is removed and is dried after drainage. Every step in the process (feeding the pulp into the mould, removing from the mould, and taking away) is carried out with the utmost precision by a large electric machine.

The resulting holders can, if necessary, be proofed at small cost and hermetically sealed in various ways, using drying oils, paraffins, resins, etc. The following table gives a comparison of prices.

Capacity in litres	Round Boxes				Packing Cases			
	0.5	1	2.5	5	10	25	35	50
"Papyroplast" . . . 1 Lt	0.30	0.40	0.80	1.0	1.90	4.60	6	9
Tin "	0.65	1.20	1.20	3.25	—	—	—	—
Wood "	—	—	—	—	2.60	6.50	8.50	12
Cardboard "	—	—	—	—	11.0	15.0	21.0	25

Cool Storage of "Valencia Late" Oranges in Victoria.

TINDALE, G. B., *Journal of the Dept. of Agriculture of Victoria*, Melbourne, 1927, Vol. XXV, Part. 5, pp. 276-279.

Experiments on storing with a view to a large supply of oranges in the summer months.

The limiting factor is the development of Blue Mould (*Penicillium* sp.).

The handling of the fruit was as follows:—

(1) *Picking*. — Done just at maturity, every precaution being taken to prevent bruising.

(2) *Sweating*. — Oranges were placed — not tipped — in cases and allowed to sweat for about a week.

(3) *Packing*. — Done according to ordinary official methods, bruising being very carefully avoided. The cases were then sent to the Government Cool Stores, Melbourne.

(4) *Storing*. — The bulk of the cases were put in a separate cham-

per at 38°F. Of the remaining twelve 3 cases each were stored in experimental chambers which were kept at the following temperatures:—34°, 36°, 38°, 40°F. Storage started in November and December. The results were as follows:—

Until the end of February spoiling in the cool store was negligible, total losses from every cause being less than 5 %. Afterwards blue mould appeared and spread. The probable cause was the lack of circulation in the cold air of the store favouring moist stagnant air and hence mould development.

A certain amount of scalding also occurred. Next year the effect of air circulation in the store will be noted.

On the other hand after 4 months storage the condition of the oranges in the experimental chambers was found to be excellent. Only the skins of those stored at 34° had become dull. The loss of weight varied between 4 $\frac{3}{4}$ lbs. per case for those stored at 40° to $\frac{3}{4}$ lb. for those at 34°. The flavour of the 36°, 38° and 40° oranges was excellent. There was no trace of surface scalding or mould on any, probably because the cases were spaced further apart and consequently no pockets of saturated air were formed.

In conclusion oranges were found subject to blue mould both prior to entering the cool store — which may be obviated by careful handling — and when in it. Spacing of the cases to allow air circulation round each case should reduce the risk to a minimum. At a temperature of $37^{\circ} \pm 2$ Valencia Lates should thus preserve excellent condition for 3 or 4 months.

Effect on Wine of Aluminium Utensils.

SCHARTZLEIN, Ch. und SAILER, E. Aluminiumgeräte in der Kellerwirtschaft und ihr Einfluss auf den Wein. *Wein und Rebe*, Mainz 1927, Jahrg. 8, Heft 3, S. 115-116 und S. 180.

To the authors was sent a wine of a repulsive, metallic astringent taste. The analysis of this wine showed the unusually high content of 387 mg Al_2O_3 per litre. Circumstances seemed to indicate that the high content of aluminium was to be ascribed to the use of aluminium utensils in the cellar. In order to clear up the point two smaller experiments were carried out which showed that under favourable conditions considerable quantities of Al_2O_3 are held in solution in the wine (28 mg. a litre in one case, 34.6 mg. in the other). The wine itself had a disagreeable smell and an objectionable, metallic astringent taste.

Although these experiments do not furnish the explanation for the extraordinary high content of Al_2O_3 in the wine, they are important in showing that in the employment of aluminium utensils in handling wine a certain precaution is to be observed, and that in no case should must or wine be left for a long time in contact with these utensils.

Special attention must be paid to the matter at the time of the multiplication of the yeast when the grape sap or the sugared wine has to be boiled, as the hot liquid dissolves more aluminium than liquid in normal temperature. Aluminium content can be so considerable that

the yeast is damaged and multiplication cannot take place. In this connection only sound, enamelled vessels should be used.

Industrial Utilization of Vine Prunings.

CERTOLINI S. Utilizzazione industriale dei residui della potatura della Vite. *Il Notiziario chimico industriale* Turin, 1927, a. II, n. 5, pag. 252-254.

Vine sprays which have hitherto been used mainly for fuel and as a source of potash may be used for feeding cattle, in the preparation of paper for packing, and in dry distillation (combustible gas, pyroligneous acid, methyl alcohol) and for the production of ethyl alcohol.

Experiments made by the writer and others clearly demonstrate the advantages, both economic and alimentary, of the use of prunings as cattle food. They are gathered and chopped into very fine fragments by specially devised cutters and are kept in silos (round deep brick silos will do or pit silos with their contents coming up to or above ground level, taking the usual precautions against the introduction of air and making use of cement where the soil is not clayey enough) In these the fragments of the vine sprays and leaves are thrown to form regular layers, the introduction of air being avoided by pressure, and a useful practice being to put some agricultural salt between the layers and, where available, vine residues which have been distilled or already used in "vinello" (a thin watery wine made from grape skins). When the top is nearly reached a good layer of straw or hay or sacking is heaped on the top to prevent the entry of rain water, and over all heavy blocks of stone, large pebbles, etc. are placed.

Fermentation soon causes the temperature of the ensiled material to rise with a consequent softening of the fibrous part, which becomes tasty, aromatic and easily digested, so that animals quickly become accustomed to the new food and eat it readily.

Two good rations for cattle in France and Northern Italy and (2) cattle in Central Italy are as follows:—

(1) Ensiled vine sprays	Kg. 15
Oats	" 2
Molasses residue	" 4
Sugar Beet pulp	" 2
(2) Ensiled vine sprays	" 12
Steeped barley	" 2
Chopped horse beans	" 1
Green barley, rape, mustard or fodder grass	" 4
Bran	" 1

The Carrière-Archimandro method, which so far has only been applied to the extraction of alcohol from seeds, is suggested for the extraction of ethyl alcohol. The various operations in this scheme may be arranged as follows:—

(1) Division and maximum breaking up of the vine shoots to dimensions of 1 cub. mm.

(2) Boiling the woody fragments for 4 hours with a 1-2 % solution of HCl, using 1 part of wood to 7 parts of solution.

(3) Separation of sugary solution from the solid matter.

(4) The sugar solution (chiefly levulose) is restored to its original degree of acidity and new fibrous matter is introduced. This is repeated twice more until the solution tested saccharometrically gives a reading of 13 %.

(5) Saturation of the hydrochloric acid with potassium carbonate and ammonium carbonate (HCl being harmful to the existence of the ferment), and replacing it with acetic acid in small relative amounts necessary for the needs of the saccharomyces.

(6) On the completion of fermentation, distillation of the alcohol containing liquid, using one of the ordinary rectification columns. Raw materials for distillation, wine residues, spoilt wines, spoilt fruit and cereals, sugar beet, molasses, etc., are dear and not plentiful, and vine prunings offer a more abundant and economic raw material.

SYLVICULTURE

Methods of Weed Control in Forest Nurseries.

I JUHLIN-HANNFELT, M Ograset i plantskolorne *Skogen* Stockholm, 1927. No. 9, year 14, p 227

II. DUTHIE, EDWIN C Nursery Weeding : a new Method of Weed-control in the Nursery. *The Scottish Forestry Journal*, Edinburgh, 1927. vol 11, pt I, p. 52.

I. The Swedish writer describes certain experiments made with sulphate of zinc and chlorate of sodium for the destruction of weeds in forest-nurseries. These experiments were begun in 1925 in garden mould slightly mixed with sand, and continued in 1926 in nurseries in which the soil consisted of fine sand with a very slight mixture of garden soil. The following weeds were subjected to the treatment — chickweed (*Stellaria media* Cyrill), meadow clover (*Trifolium pratense*), white goosefoot (*Chenopodium album* L.), meadow grass (*Poa pratensis*, *P. annua* L.), dandelion (*Taraxacum vulgare*), pansy (*Viola tricolor* L.), shepherd's purse (*Capsella Bursa-pastoris* Medic), henbit (*Lamium amplexicaule* L.), red Lamium (*Lamium purpureum* L.).

The solutions used were the following :—

20	grammes	of	sulphate	of	zinc	per	sq.	m.	dissolved	in	5	litres	of	water.
60	»	»	»	»	»	»	»	»	»	»	2.5	»	»	»
90	»	»	»	»	»	»	»	»	»	»	2.5	»	»	»
200	»	»	»	»	»	»	»	»	»	»	5	»	»	»

In the first case a percentage of 37.1 % of weeds was destroyed, in the second 73.1 %, in the third 78.3 % and in the fourth 72.0 %. In the second and third cases the experiments were verified after 2 months and in the first and fourth after 4 ½ months. The solution of 60 gm. of sulphate of zinc dissolved in 2.5 to 5.0 litres of water per sq. m. proved best. Care was taken to water the soil thoroughly at the time of sowing.

Another investigator recommends as a weed destroyer a 5 % solution of chlorate of sodium dissolved in 1 to 2 litres of water per sq. m.

In order to show the effects of sulphate of zinc and chlorate of sodium, tests were made for ascertaining in both cases the influence of these salts on the germinative faculty of forest seeds. Pine seeds were taken and placed on filter paper or in flower pots filled with garden soil. In both cases the seeds were watered either with a 5 % solution of chlorate of sodium dissolved in 1.25 litres of water per sq. m., or with a 3.6 % solution of sulphate of zinc dissolved in 2.5 litres of water per sq. m. The germination percentage of seeds placed on filter paper and watered with chlorate of sodium was 32 %, while that of seeds watered with sulphate of zinc was 65.5 %.

As regards the seeds in flowerpots filled with garden soil, watered with the same solutions, the germinative percentages were respectively 5 and 51.5.

The above-mentioned facts show that chlorate of sodium has a very destructive influence on pine seeds while the influence of sulphate of zinc is slight. Sulphate of zinc, being harmless to forest plants, is very suitable for watering with the object of destroying weeds, diminishing their growth by as much as 50 to 75 %.

On the other hand chlorate of sodium is a very effective weed killer, but since the solution is very injurious to forest plants it is only useful for the permanent paths of nurseries.

II. Other methods of destroying weeds have also been tried ; in fact, says M^r. DUTHIE, since the cost of labour in Scotland has increased by 100 % since the war, producers of nursery plants have come to the conclusion that to produce plants at a reasonable price the expenditure on weeding must be reduced.

The use of a " Prinus " soldering lamp of 3 gallons capacity with a large beak has proved very suitable. The experiments were made on 7 beds of *Picea sitchensis* and on 2 of Douglas fir (*Pseudotsuga Douglasii* L.) with satisfactory results.

In untreated beds 50 % of the plants were destroyed by weeding ; many others never reached the necessary growth to enable them to be transplanted because they were choked by weeds.

Accurate observations of the nurseries were made to discover whether the action of the flame was injurious to the young plants, and it was easily shown that the forest seeds were not destroyed, by placing a piece of white cardboard at 3 mm. below the surface in a prepared and sown bed well covered by weeds, recently germinated. Using the lamp during 5 to 10 seconds, a space of time sufficient to kill the weeds, it was seen that the piece of cardboard had not been damaged at all.

It was also noticed that in 1926 the yield in seedlings of the treated beds was much higher than that of the other beds, and that in 1927 their yield was the best possible while a considerable reduction in expenditure was also registered.

Against the employment of this method it is however objected (1) that seedlings of early germination will be destroyed by the flame ; (2) that the forest seeds may germinate before the weeds ; (3) that the weed seeds by the effect of the flame may penetrate into the ground. To the first

objection it is replied that, as is well known, a certain proportion of the seeds always germinate before the others and this fact does not cause any harm. Many more young plants are destroyed by weeding than by using the flame. The second objection certainly raises a difficulty, but by adopting good cultivation methods the weed annuals come up 10 or 14 days after the sowing and therefore much earlier than the forest plants. Meteorological conditions however always have considerable influence in this connection. As for the third objection, it is always possible that some seeds may penetrate deeply into the soil, but the method in any case destroys the annual weeds and also their seeds which are on the surface. By using a lamp consuming 6 gallons of petroleum a day one man can clean up beds 600 yards in length and 4 feet wide (800 sq. yards).

With this method 2 weedings are saved and a smaller quantity of seed can be used per square yard, because of the lower rate of loss, moreover the young forest plants which survive are stronger than when weedings are practised.

The Hydrological Function of the non-teak Forests in Java.

OOSTERLING II De hydrologische functie der in stand te houden wild-houtboschen en de waarborgen voor een goede vervulling daarvan *Leetma*, vol 20, No 6, p 538 545. Buitenzorg 1927 (with a summary in English).

The principal function of the non-teak forests in Java is to keep the rainwater in the forest-litter and to carry it off to the subsoil, thus increasing the capacity of the wells, and to regulate the height of the water in the rivers. Good forest soil is especially suitable in this respect on account of its rapid absorption of rainwater. Arable soil and grassland absorb the water much less quickly.

For hydrological reasons it is therefore of prime importance to keep the forest-soils in good condition. This can only be done when the forests are well protected. Forest-protection is therefore, from a hydrological point of view, also, an important part of the task of the Government.

The Influence of the Competition of the Roots of Shade Trees on the Growth of Young Plants.

FABRICIUS, Dr I., Prof Univ Munich *Forstwissenschaftliches Centralblatt* Berlin, 1927, Jahrg 40, Nr. 10, S 329-345

Experiments made in 1904 had proved the injurious influence exercised by the competition of the roots of a mature stand of trees, as regards the soil nutrients and water, on the development of young plants growing under their shade.

Efforts were therefore made to determine by means of scientific experiment what was the share due to the competition of the roots and the share due to want of light respectively in the death of young plants under shade trees, and then to estimate the relative importance of these conditions.

With this object, in a dense forest of mature spruce, a plot of land (a) clear of trees, 6 m. long and 2 m. wide was surrounded by a trench one spit deep. All the roots which had penetrated into this plot were cut by the trenching and removed. As regards light, rainfall and dead cover no change was made. Alongside the same plot there was a space of equal dimensions (b) on which were growing 4 spruces, 13.5 - 15 - 27 and 28 cm. in diameter at breast height respectively and also a spruce stump. The only difference between the two plots of land was therefore constituted by the penetration of roots in plot (b), since, as previously stated, the conditions of light, rainfall and dead cover were identical.

The two plots were subjected to frequent hoeings, as in garden soil, and no manure was given.

When recording the result of the experiment in September 1922 it was ascertained that the entire plot of land freed from roots was covered with green moss while plot (b) penetrated by roots was of a brown colour and without moss. Moreover, on (a) there was a normal growth of flowering meadow plants, while on (b) there were only dead specimens of such plants. The existing species of forest trees were: - oak, hornbeam, acacia, silver fir, spruce, Scots pine and larch and in the plots (a) and (b) there were also 25 small plants of beech 3 years old which had developed small terminal shoots, and on plot (a) had suffered considerably from drip, judging by the dead twigs and leaves.

In the spring of 1923 of all the plants of the previous year only the oaks and beech remained. Though the difference between the oak and beech plants of plots (a) and (b) was inconsiderable, the beech were more developed on plot (a).

It should also be noted that the removal of the roots penetrating into plot (a) increased the moisture content and caused a darker colour of the soil during the dry period and the production of a rich growth of mosses and flowering plants.

Sowing and planting experiments have proved that the competition of the roots of trees generally has a great influence on the prosperity of young plants, an influence which increases rapidly with the age of the latter and varies according to different species. This circumstance does not however confirm the opinion that the interruption of light influences the development of plants only by the formation of shade species.

Some Notes on *Picea Omorica* Pancic.

RADOUX H. *Journal Forestier Suisse*, Berne, 1927, an. 78, n° 6, p 121-123.

In a not very remote past only a single species of the genus *Picea*, namely *P. excelsa* Link, or Spruce, was known; Europe however has a second species which has hitherto been little considered but is of some importance, viz., *Picea Omorica* Pancic, which is found in some of the mountain regions of Yugoslavia.

Botanically, the firs are divided into two groups, viz., firs properly

so-called, characterized by their prismatic quadrangular needles, and firs with flattened needles. The fir in question belongs to the second group.

The needles of *P. Omorica* are arranged on cushions, flat like those of the spruce and pointed ; they are about 8 to 15 mm. long and 2 to 3 mm. broad. The cones are ovoid and from 2 to 4 cm. long. The crown is elongated, pyramidal in form and somewhat similar to that of the pyramidal cypress. The height of *P. Omorica* slightly exceeds 40 m. and its diameter at breast-height is about 50 cm. According to the botanist Prof. PANCIC, who discovered this tree in 1872, its timber, while resembling that of the spruce, is deeper coloured, more resistant and more durable

Thanks to the efforts of Prof. PANCIC, *P. Omorica* was cultivated and is now on account of its decorative form and robust growth, frequently to be found as an ornamental tree in parks in Central Europe.

According to the German botanist, F. W. NEGER, the actual distribution of *P. Omorica* depends on climate. After the last glacial period this tree had to retreat into high regions where the climate is characterized by a low mean temperature and by a long suspension of vegetation. Effectively, the area in which this tree now grows is limited to the northern slopes of certain mountain chains in Serbia, Bosnia and Bulgaria. It still remains to be determined whether and under what conditions *P. Omorica* is suitable for forest growth.

PLANT PROTECTION

DISCOVERIES AND CURRENT EVENTS IN WORLD PHYTOPATHOLOGY

Canada : Heterothallism and Mutation in Rust Fungi (1).

An interesting contribution emanates from the Dominion Rust Research Laboratory, Winnipeg, relating to our studies of the sexual reactions of *Puccinia graminis*, which have been undertaken to investigate the possibility of new physiological forms arising by hybridization of existing forms. Heterothallism is known to exist in many of the large fungus groups. Recent investigations indicate that it probably occurs among the rust fungi as well. The majority of experiments were made with *P. helianthi*, the sunflower rust, but preliminary work suggests that *P. graminis*, wheat stem rust, is also heterothallic. This discovery is of extreme scientific interest and likely to be of practical importance, since it suggests that the crossing of strains must at least be regarded as a possibility.

* * *

In regard to the constancy of physiologic forms of *Puccinia graminis tritici*, the assumption has been that the whole problem of rust control by resistant varieties is based on the idea that biological forms are constant. At present the only criterion of the constancy of a biologic form is its infection capability. It would appear that forms which give a heterogenous reaction on certain differential hosts, at least are more sensitive to environmental changes than other physiological forms. In 1926 we observed in our work at the Dominion Rust Research Laboratory at Winnipeg that among the normal uredinia produced from monospore

(1) Communication from the official correspondent to the Institute, Mr. H. T. Güssow, Dominion Botanist, Central Experimental Farm, Ottawa.

cultures there occurred a few greyish brown pustules. Continually, generation after generation this happened to be the case. Later on from another isolation there appeared pronounced yellow uredinia aside from the normal reddish brown. Careful studies and repeated isolations were made, which seemed to prove that a morphological difference existed, the yellow spores being shorter than the red spores. Considering the difference in colour, spore germination and morphology, it seems apparent that a change has taken place in these cultures which one might feel inclined to regard as a mutation, and if such, as a mutation with loss of character, *i. e.*, of a retrogressive type.

Egypt : Locust Invasion (1).

Towards the end of last October an invasion of locusts was reported in the district of El-Derr (Province of Assuan, Upper Egypt).

Palestine : Short Observations concerning some recently discovered or little known Plantation Pests (2).

A. Citrus plants. — *Dionconotus cruentatus* Brullé (Rhynch. Caps.). This Rhynchota develops on Gramineae and weeds in February and March. In the neighbourhood of Jaffa it passes every year in considerable quantities on to the orange flowers which fall off in consequence. The damage principally occurs in wet orange groves where the ploughing in of the weeds in January is difficult. Up to 50 % of the crop has been affected and on some trees not more than 50 flowers have remained. Control of the pest is best effected by ploughing in the weeds in January and — where this is not possible — by pulling them up by hand.

Papilio machaon L. (Lep. Papil.). — As food plants for the swallowtail butterfly only *Ruta* and the Umbelliferae have been known up to the present time, but in November last caterpillars were found actually feeding on *Citrus amara*. This discovery is of interest because insects very similar to this species are known in India, Africa and America as very noxious citrus pests. The occurrence of *Papilio machaon* in this connection has not however been observed previously.

Tetramorium caespitum judas Wheeler (Hym. Form.). — In Ain Charod the bark of newly planted *Citrus amara* was last year completely "girdled" by this very active black ant, with resulting decay of the plants. Of 600 trees 200 had been destroyed within a week. The damage stopped immediately on laying open the root collars or on wrapping them in cloth soaked in petroleum. No further damage has been observed.

(1) Communication from the Ministry of Agriculture of Egypt, forwarded by Mr. K. A. RAHIM, Delegate of Egypt on the Permanent Committee of the International Institute of Agriculture.

(2) Communication from the official correspondent to the Institute, Dr. F. S. BODENHEIMER, Entomologist, Palestine Zionist Executive, Agricultural Experiment Station, Tel-Aviv.

Cryptobabes gnidiella Mill. (Lep. Pyr.). — During the autumn the caterpillar of this moth develops to a large extent in ripening oranges causing them to drop off. The caterpillar penetrates into the fruits only where they are in contact with some branch or with another fruit, when consequently the peel is softer than usual.

In certain nurseries, caterpillars of *Laphygma exigua* Hb. (Lep. Noct.) and of *Prodenia litura* F. (Lep. Noct.) were found eating the leaves of *Citrus amara* and of sweet orange trees respectively.

In a decaying orange tree was found *Stromatium fulvum* Vill. (Col. Ceramb.) which had most probably developed in the wood that was already withering.

B. Almonds. — The roots and root collars are often infested by the larva of *Capnodis carbonaria* Klug, *Capnodis cariosa* Pall., *Chalco-phorella stigmatica* Schoenh. and *Perotis chlorana* C. et G. (Col. Bupr.). It is not yet ascertained if the case is one of primary or secondary damage. In the mountain regions, larvae of *Cerambyx dux* Feld (Col. Ceramb.) are developing also in the trunks of almond trees in great numbers.

Lymantria lapidicola var. *phoenissa* Rghfr. (Lep. Lymantr.). — In the day time the caterpillars live in groups hidden underground or under stones near the root collar. During the night they swarm especially on young trees which they often entirely strip of their leaves. Special grease-bands are an adequate control measure; "Tanglefoot" and "Raupenlein Ichneumin", have proved very effective in this climate.

Other leaf grawing insects are caterpillars of *Saturnia pyri* L. (Lep. Saturn.), *Diloba coerulcocephala armena* Stgr. (Lep. Noct.), the caterpillars of *Cimbex quadrimaculata* var. *humoralis* Müll. (Hym. Tenthréd.), and also the beetle *Gynandrophthalma viridana* Lac. and *G. limbata* Stev. (Col. Chrysomel.).

In summer the aphid *Tuberodryobia persicae* Chol. is to be found in great numbers on the trees.

Eurytoma amygdali Fnd. (Hym. Chalc.), already known from the investigations of AHARONI and LÆSNE, develops on the fruit, and on dried fruits the caterpillars of *Ephesia clutella* Hb. and *Myelois ceratoniae* Z. (Lep. Pyral.).

More serious damage is caused sometimes by the caterpillars of the first generation of *Anarsia lineatella* Z. (Lep. Gelech.), which gnaw the young shoots.

C. Vines. — *Paropta paradoxa* H. S. (Lep. Coss.). Great quantities of these caterpillars bore into the woody stems of the old vine (Kastinich, February 1927), without doing great damage.

Caterpillars of *Euprepia oertzeni* Ld. and *Ocnogyna loewii* Z. (Lep. Arct.), and also of *Agrotis segetum* L., *Laphygma exigua* Hb. (Lep. Noct.), *Chaerocampa celerio* L., *C. alecto* L., *Deilephila livornica lineata* Esp. (Lep. Sphing.), *Pyrameis cardui* L. (Lep. Nymph.) and *Ino ampelophaga* Bayle (Lep. Zyg.) caused decay of the leaves. Means of destruction: spraying with *Urania* green.

The following insects have gnawed the buds and the young leaves : *Opatroides curtulus* Fr., *Mesostemus laevigatus* (Col. Tenebr.) and *Gynandrophthalma viridana* Lac. (Col. Chrysomel.).

Schistocerus bimaculatus Ol. (Col. Bostrych.), as also *Ceratina tibialis* (Hym. Apid.), occurs not only in dead but also in living wood of vine stems.

In the last year *Leucotermes lucifugus* Rossi has done great damage by gnawing green stems and even leaf-stalks. An effective control measure is not known as yet.

D. Olives. — The most important parasites of the olive are *Dacus oleae* Rossi (Dipt. Tryp.) and *Zeuzera pyrina* L. (Lep. Coss.).

In the mountain region many medium-sized and small twigs are attacked by a Cecidomyid. Where attacked the bark takes on a bluish colour and underneath are found 20-30 gall-gnat larvae, which it has proved impossible to breed out. Afterwards the bark bursts and the whole branch dies off. If the damage is not very considerable, the trees often recover.

E. Apples. — *Carpocapsa pomonella* L. (Lep. Tortr.). It may be of interest that the above insect develops only two generations even in the warm coastal plains of Palestine.

Caterpillars of *Clix glaucata* Sc. (Lep. Drepan.), *Nychiodus lividaria* HB. (Lep. Geom.) effect leaf decay. Caterpillars of *Euzophera immundella* Rag. (Lep. Pyr.) gnaw the root collar. Specimens of *Tenuipalpus bodenheimeri* Berl (Acar.) are to be found in winter and in spring in great quantities on the buds and young shoots.

Dominican Republic : Specialization of *Albugo* on *Ipomoea* (1).

Cross infection trials have established the fact that *Albugo Ipomoeae-panduranae* (Schw.) Sw. which produces "white rust" on sweet potatoes (*Ipomoea Batatas*) is biologically distinct from the agent of the same disease on another of the Convolvulaceae family, *I. Pes-caprae*. It is probable that this specialization extends to other Convolvulaceae. Consequently two new species or biological forms have been determined, namely: *A. minor* (Speg.) Cif. n. comb. on *I. Batatas* and *A. Ipomoeae Pes-caprae* Cif. n. sp. on *I. Pes-caprae*.

(1) Communication from the official correspondent to the Institute, Dr. R. CIFERRI, Phytopathologist and Director of the " Estación Nacional Agronómica y Colegio de Agricultura " at Moca.

VARIOUS QUESTIONS RELATING TO PLANT PROTECTION IN THE DIFFERENT COUNTRIES

New Zealand : Activities in Field of Plant Pathology in 1927 (1).

1. A cereal disease survey was conducted during January, the principal cereal-growing regions being thoroughly examined.

Rusts: It was found that the common rust of wheat was *Puccinia elymi* (*P. triticea*), *P. graminis* being confined to a few local areas. On barley *P. anomala* was prevalent throughout. On oats *P. coronata* proved to be the common rust occurring in practically every crop, whereas *P. graminis* was found in but a few localities. Although general, rusts have not appeared to do much damage this season, possibly because they did not appear until late in the season.

Smutts: *Tilletia levis* and *T. tritici* were found in 18 % of the crops, but cannot be considered as being of serious import as the highest infection found was 5 %. The small amount of this disease is accounted for in that the farmers regularly treat their seed grain with copper sulphate or formalin solution.

Ustilago tritici was found to be widespread, ranging from a trace in such wheat varieties as Solid Straw Tuscan to 12 % in White Straw Tuscan. On barley this species was found in only three crops — two of the varieties Cape and one of Black Skinless, infection ranging from a trace to 1 %.

U. jensenii was general through all barley crops, ranging from a trace (approx. 0.1 %) to 12 %. Its prevalence was accounted for by the fact that few growers were in the habit of "pickling" their seed. Experiments have demonstrated that oat-smut may readily be held in check by the use of formalin solution, 1 pint to 30 gallons of water.

Other diseases:—*Ophiobolus graminis* was found to be much more widely distributed than was usual, a trace occurring in 10 % of the crops examined, irrespective of locality. Most infections recorded appeared as single plant infections, the "patch" condition being confined to one or two localities.

Gibberella saubinetii was found in 5 % of crops examined, the degree of infection ranging from a trace to, in one locality, 30 %.

Other diseases recorded were white-head (*Fusarium* spp.) causing a foot-rot of oats, wheat and barley; wheat spot and oat spot (*Septoria*

(1) Communication from Dr. G. H. CUNNINGHAM, Mycologist, Department of Agriculture, Wellington, official correspondent to the Institute.

graminis; mildew (*Erysiphe graminis*) which was noted on 12 % of spring sown wheat crops and three barley crops.

Dry-rot of swedes and turnips has been demonstrated to be (a) seed-borne: (b) caused by *Phoma lingam*.

2. A laboratory and field control of *Phoma lingam* on swedes has been worked out. This consists in steeping bags containing infected seed in a 0.25 % hot Semesan held at 115° F. solution for one hour. The seed is then dried by passing over it a current of hot air.

Field precautions necessary following the treatment of this seed are (1) to rid all seed-drills from previous season's seed; (2) to avoid sowing on land which has been in Brassicas twelve months' previously; (3) to sow only treated swede and turnip seed on any one property, thus obviating the danger of contamination through cultural implements, wandering stock, rodents and the like.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Brazil. — By a "resolução" of 22 February, 1927 the State of Rio Grande do Sul has been declared a zone infested by grape phylloxera (*Phylloxera vastatrix*). Exportation from this State into every other part of Brazil, both by sea and by land, is therefore forbidden of vines and parts of vine unaccompanied by the respective transit permit attesting to their proper healthy condition. (*Boletim do Ministerio da Agricultura, Industria e Commercio*, Rio de Janeiro, 1927, anno XVI, vol. I, n. 3, pag. 283).

*** The Minister of Agriculture, Industry and Commerce by "resolução" of 8 March, 1927 has approved the scheme for carrying out the work of plant protection assigned to the "Instituto Biologico de Defesa Agricola". This work, which will be performed by inspectors and assistants of the "Defesa Agricola" and in their respective districts, includes visits to the crops for ascertaining the existence of diseases or plant pests, the immediate notification to the Institute of any diseases or pests observed, the collection of material for investigation purposes, the sending of monthly progress reports, etc. (*Boletim do Ministerio da Agricultura, Industria e Commercio*, Rio de Janeiro, 1927, anno XVI, vol. I, n. 4, pages. 433-434).

Belgian Congo (1). — The Governor General has forbidden by an Order dated 15 March, 1927 the cultivation of the silk cotton tree (*Erio-*

(1) Communication from the official correspondent to the Institute, Dr. Pierre STANER, Director of the Mycological Laboratory, Eala.

dendron anfractuosum) in districts opened to cotton growing as a control measure against the Pink Boll Worm (*Pectinophora gossypiella*).

Italy. — The Minister of National Economy by Decree of 12 August, 1927 has fixed the special technical rules to be observed in the exportation of citrus fruits: lemons ("limoni"), green lemons ("verdelli"), confectionery lemons, oranges, bitter oranges ("bitters" and "confectionery bitters") from Sicily; lemons of Maiori; oranges of Sorrento or of Salerno; lemons and oranges of Rodi from Gargano; lemons and oranges from Calabria; mandarines.

Citrus fruit for exportation abroad must be, *inter alia*, free from scale insects and in particular from *Parlatoria zizyphi* and from *Chrysomphalus dictyospermi*. (*Gazzetta ufficiale del Regno d'Italia*, Roma, 19 settembre 1927, anno 68°, n. 217, pp. 3800-3806).

* * By virtue of Decree-Law No. 1754 of 12 August, 1927, "Consorzi" of olive growers may be established in extensive olive growing zones in accordance with the rules laid down in art. 6 of Law No. 888 of 26 June, 1913, with the aim, *inter alia*, of increasing olive growing, of the reconstitution of old or broken down olive yards and of the use of efficient control measures against the diseases and pests of the olive tree.

The "Consorzi" may be intercommunal and provincial and are allowed to form federations among themselves for the better attainment of their special ends.

The establishment of a "Consorzio" may be made obligatory by the Prefect, in accordance with the advice of the Provincial Economic Council, in cases where olive growing is of great importance in the Province and where the lack of a "Consorzio" is harmful or dangerous.

The "Consorzi" have the right of imposing on individual members a contribution of not more than 0 10 Liras for every olive tree in bearing cultivated by each member.

The funds thus collected and completed by contingent contributions from the State are used by the "Consorzi" for the attainment of their programme. (*Gazzetta ufficiale del Regno d'Italia*, Roma, 30 settembre 1927, anno 68°, n. 226, p. 3937).

* * The Department of Agriculture of the United States of America has consented for this year to the importation of Italian chestnuts under the express condition that consignments shall be accompanied by a phytopathological certificate which must attest to the previous disinfection of the chestnuts themselves.

In accordance with this ruling the Italian Minister of National Economy has ruled that this certificate shall be issued by the "R. Istituto superiore agrario" at Portici (for consignments from Southern Italian Ports), by the "R. Stazione di Patologia vegetale" at Rome (for consignments from Central Italian ports) and from the "R. Osservatorio di Fito-patologia" at Turin (for consignments from Northern Italian ports).

The issue of the certificate is subject to the following conditions :

(a) examination of the different lots of chestnuts deposited in store-houses or exposed for sale in the markets for the determination of the amount of infection by *Carpocapsa* or *Balaninus* ;

(b) selection of the lots which are found infected ;

(c) disinfection of all those lots which are destined for exportation to the United States.

The Directors of the above agrarian institutions may take what measures they consider best for the disinfection, though attention is actually drawn to the method suggested by the Federal Horticultural Board of the United States, which consists in immersion in hot water at 122° F for 40 minutes and subsequent drying

Exportation is allowed under the following conditions :

(a) the chestnuts shall not contain any living worm nor more than 20 % of dead worms ;

b) the goods may be rejected by the United States Inspection Service if the above imposed conditions have not been complied with ;

c) the expenses involved in the inspection and in the issue of certificates shall be charged to the interested parties (1).

Mexico. — By " acuerdo " of the " Secretaría de Agricultura y Fomento " dated 18 April, 1927 and in accordance with the orders of the Regulation of 18 April, 1927 of the " Ley de Plagas " the parts occupied by the States of Sonora, Sinaloa and Nayarit — designated in the text of the " acuerdo " as the " Estados del Noroeste " — have been declared a " zona de defensa agrícola " and trade in plants and plant products in the above zones is subject to the following rules :

(1) The introduction, transit or exportation from the " Estados del Noroeste " of the following products is prohibited except by previous official permit of the " Oficina para la Defensa Agrícola " and after previously undergoing fumigation or inspection and the prophylactic operations laid down by it :—

(a) cotton seeds, the seed coats of cotton, cotton bolls, and generally speaking everything connected with the cotton plant whatever its species or variety ;

(b) Avocado pear fruits, sugar cane, oranges, limes, fruits of *Diospyros*, *Achras Sapota*, *Mammea*, *Anona Cherimolia*, *Psidium Guajava*, plums, peaches, sweet potatoes, turnips, fruits of the bitter orange and its varieties, potatoes and all the plants of the sub-family *Citraceae*, including seeds, stems, etc.

(1) Communicated by the Ministry of National Economy, Rome.

The only ports from which agricultural products may be introduced into the above States are : Estación de Guadalajara (Jal.), Guayanas (Son.), Yavaros (Son.) and Mazatlán (Sin.).

All freight cars coming from the centre and the south of the country and wishing to enter on the South Pacific Railway, from Guadalajara to the North, must undergo inspection by the " Oficina ", in order that those found to be loaded with products subject to fumigation shall be duly fumigated.

Products for entry into the country through the seaports given above must be inspected and provided with the respective health certificate.

Passengers and publicity agents travelling on the South Pacific Railway are prohibited from introducing into or exporting from the " zona de defensa " of the " Estados del Noroeste " fruits of every kind unless previously inspected by the " Oficina ".

Until the installation of the Guadalajara " Planta Fumigadora " is ready, fumigation and disinfection in the said locality will be subject to orders issued by the " Oficina " and the expenses of the respective operations charged to the parties interested. Fumigation dues in the " Plantas Fumigadoras " will be 10 " pesos " per car.

(2) The parts comprising the districts of the Republic invaded by the " mosca de la fruta " [*Ceratitis capitata*] have been declared a " zona de combate " and control measures against this pest will be undertaken without delay.

(3) Fruit and market garden produce whatever their destination are subject to inspection when coming from the Municipalities of San Marcos, Etzatlán, Ahualulco, Ameca, Amatitín, Arenal, Magdalena and Tequila which lie north of Jalisco, and of Ixtlán del Rio and Aguacatlán south of Nayarit, and their loading will only be authorized on a special permit of the " Oficina " which will be issued only for those products found free from diseases and pests

The loading of the following products will only be allowed after fumigation : rice, maize, banana plants, bulbs of all sorts, branches, layers, " brotes de fruta ", plants, nuts, seeds of palms and fruit trees, ornamental and shade trees. (*Diario oficial*, México, 30 de abril de 1927, tomo XLI, núm. 37, pág. 6).

* * * The Regulation of 18 April, 1927 lays down the methods to be adopted in phytopathological inspection and in enquiries regarding crop diseases and pests.

The " Secretaría de Agricultura y Fomento " acting through the " Oficina para la Defensa Agrícola " is authorized to carry out inspections and enquiries even on private estates to determine what crop pests and diseases are present in any given district of the country and to apply such pre-

ventive and control measures as are authorized by the "Ley de Plagas" of 15 November, 1924 and by the present Regulation.

Once the presence of a pest or disease has been determined, or there are well founded reasons for fearing its appearance in a given region, the "Secretaría" maps out and fixes the boundaries of each of the so called "zonas de defensa". The introduction or transport within or the removal from these zones of any article scheduled in the declaration of the "Secretaría" as a carrier of the pest or disease demanding prevention or control is then prohibited.

In cases where the "Secretaría" considers that the disinfection or fumigation of certain of these articles is enough to prevent the spread of the pests or diseases in question, the transit of these articles through the "zona de defensa" may be authorized, always provided they are accompanied by a health certificate issued by the fumigation and disinfection agencies specially established by the Federal Government. The introduction or exportation of these articles will take place through channels fixed by the "Secretaría".

The disinfection and fumigation dues and those for the issue of health certificates are charged to the interested parties, being based on tariffs fixed by the "Secretaría", and the revenue from them will be devoted to the maintenance and development of the phytosanitary Service of the Republic.

Transport firms are only allowed to carry in or out of the "zonas de defensa" goods prohibited by law, provided that they introduce or export them through the officially recognized places, the goods transported being accompanied by the prescribed health certificate.

Owners, tenants or occupiers of all agricultural estates situated within the "zona de defensa" must give notice to the "Oficina" of any circumstance which seems to point to disease or to one of the scheduled pests; they are moreover obliged to apply on their own account, on the lines which will be indicated to them, all control measures against the pest or disease in question according to the "Oficina's" instructions; in case of non-fulfilment the necessary steps will be taken by the agents of the "Oficina" at the expense of those interested.

Infringements of the rules of the present Regulation will be punished by dismissal in the case of Government employees or with fines of not less than 10 "pesos" nor more than 1000 "pesos" without prejudice to further sanctions, in the case of private individuals or firms.

All goods illegally exploited will be considered infected and will be treated in accordance with the rulings issued by the "Secretaría" for diseased plants or plant products. (*Diario oficial*, México, 20 de abril de 1927, tomo XLI, núm. 37, pág. 7).

* * By an "acuerdo" of the "Secretaría de Agricultura y Fomento", dated 21 April, 1927 Regulations have been issued for the control of the Cotton Boll Weevil ("picudo del algodón", *Anthonomus grandis*) throughout the Republic.

The cotton growers are required to notify to the "Oficina para la Defensa Agrícola" at San Jacinto, D. F., either directly or through its own local officials or other specially appointed agents, the appearance of the boll weevil in their plantations and at the same time to indicate the severity of the attack, the area involved and the extent of the damage caused to the crop.

In the infected or suspect zones "Juntas locales y regionales de Defensa" will be established which will be required to co-operate with the "Oficina" wherever it is necessary to provide for compulsory control and destruction of the boll weevil.

Fumigation and sterilization of cotton plants and parts or products of cotton plants intended for exportation from the infected zone are compulsory, previous notice being given to the "Oficina", which will decide as to the efficacy of the measures adopted for this purpose.

All sowings will be subject to the special regulations issued by the "Oficina" in order to prevent the spread of the insect within the infected or suspect zones. (*Diario oficial*, México, 18 de mayo de 1927, tomo XLII, núm. 14, pág. 5).

* * By an "acuerdo" of the "Secretaría de Agricultura y Fomento" dated 26 April, 1927, the following cotton zones of the Republic have been declared infested by the Cotton Boll Weevil ("picudo del algodón", *Anthonomus grandis*):

In the State of Tamaulipas the Municipalities of Nuevo Laredo, Matamoros, Reynosa, Camargo, Mier, Guerrero, San Fernando, Soto la Marina, Güémez, Ciudad Victoria, Jaumave and San Manuel; in the State of Chihuahua the districts of Ciudad Camargo, Jiménez and Hidalgo. In the States of Durango and Coahuila a zone has been declared infested having the following boundaries: taking as centre the city of Torreón, Coah., the said zone is bounded by the stations of the National Railways of Mexico and her dependencies: in the North, on the trunk-line México-Ciudad Juárez, Escalon, Chih. (1300 km.); in the South, on the same line, Empalme Cañitas, Zac. (814 km.); in the East, on the line Saltillo-Torreón, Parras, Coah. (152 km.) and Hipolito, Coah. (229 km.), on the line Torreón-Monterrey; in the West, Pedrisesa, Dgo. (174 km.) on the line Torreón-Durango.

Furthermore the Municipality of Rodeo in the State of Durango is considered an infested zone. (*Diario oficial*, México, 18 de mayo de 1927, tomo XLII, núm. 14, págs. 5-6).

RECENT BIBLIOGRAPHY

Bachala, A. Les poudrages et la protection du vignoble. *Le Progrès Agricole et Viticole*, Montpellier, 1927, 48^e année, tome LXXXVIII, n° 29, p. 60-61.

Bailly, A. Insecticides antiricryptogamiques. *Revue de Viticulture*, Paris, 1927, 34^e année, tome LXVII, n° 1723, p. 8-10.

Bertus, L. S. Grey blight of tea and coconut A comparative study. *Ceylon Journal of Science, Section A. Botany, Annals of the Royal Botanic Gardens, Peradeniya*, Ceylon-London, 1927, vol. X, part 2, pp 197-241, pl. V-X.

[*Pestalotia Theae* Sawada, *P. Palmarum* Cke.]

Bonelli, GIUSEPPE Pro e contro il passero La cattura del passero. *L'Idea Zoofila e Zootecnica*, Milano, 1927, anno II, nn 5-6, pp 11-13, 2 figg.

Bryan, MARY K. The flagella of *Bacillus amylovorus*. *Phytopathology*, Lancaster, Pa., 1927, vol 17, n° 6, pp. 405-406, pl. XVIII.

Buchard, P. La destruction des mauvaises herbes dans les champs de blé et le drainage mécanique en Seine-et-Oise. *La Vie Agricole et Rurale*, Paris, 1927, 16^e année, t. XXX, n° 25, p 395.

Clark, ROBERT M June drop control of the apple curculio. *American Fruit Grower Magazine*, Chicago, Ill., 1927, vol. XLVII, no. 5, pp. 4, 21, 3 figs.

[*Anthonomus quadrigibbus* Sav.]

Drechsler, CHARLES An emendation of the description of *Ophiobolus heterostrophus*. *Phytopathology* Lancaster, Pa., 1927, vol 17, no. 6, p. 414

[*O. heterostrophus* does harm to the leaves of maize in many hot countries]

Fawcett, G. L. The curly top of sugar beet in the Argentine. *Phyto-*

pathology, Lancaster, Pa., 1927, vol. 17, no. 6, pp. 407-408

[*Agallia stichcolis* Stål transmits the disease]

Froggatt, J. L. The banana thrips (*Anaphothrips signipennis* Bagnall). *Queensland Agricultural Journal*, Brisbane, 1927, vol. XXVII, part 3, pp 186-190, pl. 47-48.

Fron, G Emploi du bisulfate de potasse pour la destruction des plantes adventices. *Comptes rendus des séances de l'Académie d'Agriculture de France*, Paris, 1927, tome XIII, n° 20, p. 655-660.

Gabotto, L. Giallume e deperimenti nelle viti innestate. *Giornale Viticolo Italiano* Casale Monferato, 1927, anno 53^o, n° 29, pp 340-341.

Gäumann, ERNST Die wirtschaftliche Bedeutung unserer wichtigsten Pflanzenkrankheiten *Landwirtschaftliches Jahrbuch der Schweiz*, Bern, 1927, 41 Jahrg, S. 319-324.

George, LUCIENNE. Observations sur la biologie de deux Hyménoptères entomophages. *Bulletin de la Société d'Histoire Naturelle de l'Afrique du Nord*, Alger, 1927, tome XVIII, n° 3, p 55-71

[*Apanteles* (= *Microgaster*) *glomeratus* L., and *Pteromalus puparum* L., parasites of *Pieris brassicae* L.]

Ghesquière, J. A propos des faux-cotonniers congolais et de leur possibilités culturales *Annales de Gembloux*, Bruxelles, 1927, 33^{me} année, 5^{me} livraison, p. 173-188 (références bibliographiques, p. 187-188).

[A list is given of the diseases and enemies of *Ceiba*, *Gossampinus* and *Bombax* spp in Africa]

Groh, HERBERT A Prince Edward Island weed survey *Scientific Agriculture*, Ottawa, 1927, vol VII, no 10, pp 388-395

Guyot, L Le problème actuel des anticryptogamiques *Journal d'A-*

griculture pratique, Paris, 1927, tome I, n°12, p.236-238; n°16, p.318-320.

Hardison, A. C. The status of the white fly campaign. *Monthly Bulletin of the Department of Agriculture, State of California*, Sacramento, California, 1927, vol.XVI, no.3, pp.132-134.

[*Aleyrodes*].

Hege, HANS. Das Wesen der Gelbrosterkrankung des Weizens. *Deutsche Landwirtschaftliche Presse*, Berlin, 1927, 54.Jahrg., Nr.6, S.71-73.

Heim, ROGER. Fungi Brigantiani (Deuxième série). *Bulletin trimestriel de la Société Mycologique de France*, Paris, 1927, tome LXIII, 1^{er} fasc. p.59-94, fig.1-13.

[List comprising 8 *Ustilaginales* and 110 *Uredinales* collected from 1922 to 1925, in the upper valley of the Durance (France)].

Heppner, M. J. A few facts about Bordeaux mixture. *California Cultivator*, Los Angeles San Francisco, 1927, vol. I, XVIII, no 10, p.288.

Hurd-Karrer, ANNIE MAY and Has-selbring, HEINRICH. Effect of smut (*Ustilago zeae*) on the sugar content of cornstalks. *Journal of Agricultural Research*, Washington, D. C., 1927, vol. 34, no.2, pp.191-195.

Jachontov, V. Matériaux pour servir à l'étude morphologique du développement de l'*Ernestia consobrina* Mg. (Diptera, Tachinidae). *La Défense des Plantes*, Leningrad, 1927, vol IV, n°1, p.22-25, fig.1-13.

[In Russian, with French title].

Jaczewski, A. Mesures pratiques contre les maladies de la dégénérescence. *La Défense des Plantes*, Leningrad, 1927, vol.IV, n°1, p.62-77.

[In Russian, with French title].

James, H. C. The life history and bionomics of a British phytophagous Chalcidoid of the genus *Harmolita* (*Isosoma*). *The Annals of Applied Biology*, London, 1927, vol.XIV, no.1, pp.132-149, fig.1-12.

[*Harmolita graminicola* (Gir) on *Triticum repens*].

Jatzynin, K. La méthode dite sèche de désinfection du millet. *La*

Défense des Plantes, Leningrad, 1927, vol.IV, n°1, p.154-158.

[In Russian, with French title].

Kasal, JAROSLAV. Endommagements des peuplements forestiers, causés par les exhalaisons des fumées des entreprises houillères. *Les-nická Práce*, Piskú, 1927, ročník VI, číslo 4, str. 145-184, obr.1-9.

[In Czech, with title and abstract in French].

Kashkarov, D. and Lein, I. The yellow ground squirrel of Turkestan, *Cynomys fulvus oxianus* Thomas. *Ecology*, Brooklyn, N. Y., 1927, vol.VIII, no.1, pp.63-72, fig.1-3.

Killian, CHARLES. Le *Phyllachora Podagrariae* (Roth) Karst. parasite de l'*Aegopodium Podagraria* L. *Bulletin trimestriel de la Société Mycologique de France*, Paris, 1927, tome XLIII 1^{er} fasc., p.41-48, pl.III-IV.

Kirby, R. S. Diseases of small grains. *Cornell Extension Bulletin published by the New York State College of Agriculture at Cornell University, Ithaca, New York*, Bulletin 157, Ithaca, 1927, 71pp., 31 figs.

[Deals with the diseases of wheat, oats, barley and rye].

Kleine, R. Fritfliegenbefall und Kornqualität. *Zeitschrift für angewandte Entomologie*, Berlin, 1927, Bd XII, Heft 3, S.412-427.

[*Oscinus frisk*].

Link, G. K. K. and Sharp, C. G. Correlation of host and serological specificity of *Bacterium campestris*, *Bact. flaccumfaciens*, *Bact. phaseoli*, and *Bact. phaseoli sojense*. *The Botanical Gazette*, Chicago, Illinois, U. S. A., 1927, vol.I, XXXIII, no.2, pp.145-160.

María, APOLINAR. Insectos nocivos en los pastos de la Sabana de Bogotá. *Revista de Industrias*, Bogotá (Colombia), 1927, vol. III, núm.35, págs.413-415.

[*Clavipalpus ursinus* Bl., *Manopus biguttatus* Casteln., *Cyclocephala ustulata* Brm., *Cycl. scarabaeoides* Brm., *Heterogomphus dilaticollis* Brm., *Monocrepidius semimarginatus* Lat., *Eriopsis con-neza* Germ.].

McDougall, W. B. and Jacobs, MARGARET C. Tree mycorrhizas from the central Rocky Mountain region. *American Journal of Botany*, Lancaster, Pa., 1927, vol. XIV, no 5, pp. 258-266, pl. XXIX.

[The ectotrophic mycorrhizal fungi studied here are in all cases parasitic on the roots of the host plants which are in no way benefited but may be harmed by the micorhizal relation].

Mercuri, S. I danni della lebbra o bolla del pesco (*Exoascus deformans*). *Il Lavoro d'Italia Agricola*, Roma, 1927, anno I, n. 21, p. 4, 1 fig.

Miles, HERBERT W. On the control of glasshouse insects with calcium cyanide. *The Annals of Applied Botany*, London, 1927, vol. XIV, no 2, pp. 240-246.

Millard, W. A. and Taylor, C. B. Antagonism of micro-organisms as the controlling factor in the inhibition of scab by green manuring. *The Annals of Applied Botany*, London, 1927, vol. XIV, no 2, pp. 202-216, pl. XV-XVII.

[*Actinomyces Scabries*, *A. praecox*].

Montemartini, LUIGI. A proposito del parassitismo facoltativo di alcuni funghi saprofiti. *Rivista di Patologia Vegetale*, Pavia, 1927, anno XVII, nn 5-6, pp. 115-117, 1 fig.

[*Penicillium glaucum* on the cut surface of a potato tuber].

Moznette, G. F. Notes on some insects occurring on the Island of New Providence, Bahauna Archipelago, and their bearing on horticulture in Florida. *The Quarterly Bulletin of the State Plant Board of Florida*, Gainesville, Florida, 1927, vol. XI, no. 3, pp. 119-121.

[Enumeration of insects harmful to *Persea gratissima*, *Mangifera indica*, *Achras Sapota*, *Artocarpus incisa*, *Citrus* spp., *Anona* sp., *Musa sapientum*, *Cryptostegia grandiflora*].

Muccioli, MARCELLO. L'arsenico presso i Cinesi. *Archivio di Storia della Scienza*, Roma, 1927, vol. VIII, n. 1, pp. 65-76.

[Recalls *inter alia*, the most ancient use, obtaining among the Chinese, of arsenical preparations for the control of plant pests and particularly rice pests].

Nenjukov, D. Sur quelques particularités de la nutrition chez les Lé-

pidoptères. *La Défense des Plantes*, Leningrad, 1927, vol. IV, n°1, p. 12-14. [In Russian, with French title].

Obolensky, S. Substances nouvelles pour l'extermination des Mammifères nuisibles. *La Défense des Plantes*, Leningrad, 1927, vol. VI, n°1, p. 159-161.

[In Russian, with French title].

Papachrysostomou, COSTA. Entomological notes. *The Cyprus Agricultural Journal*, Nicosia, Cyprus, 1927, vol. XXII, part 1, pp. 7-8.

[*Laphygma erugua* B.H. on potatoes, tomatoes, beans, rape, onions; *Neopyramis cardui* L. on artichokes, etc.].

Passalacqua, T. La zigena della vite (*Ino ampelophaga*). *Curiamo le Pianta! e La Difesa delle Pianta contro le Malattie ed i Parassiti*, Alba, 1927, anno IV e XXII, n. 5, pp. 95-97.

Peglion, V. e Sacchetti, M. Intorno alla peronospora del lillà (*Phytophthora Syringae*, Klebahn). *Rendiconti delle sedute della Reale Accademia Nazionale dei Lincei, Classe di Scienze fisiche, matematiche e naturali*, Roma, 1927, vol. V, fasc 9, pp. 696-698.

Pesenti, FEDERICO. Il marciume radicale o mal del falchetto. *Bullettino dell'Agricoltura*, Milano, 1927, anno 61° n. 24, p. 2.

[*Armillaria mellea*, *Dematophora necatrix*, *D. glomerata*, *Rosellinia aquila*, *Rosellinia hypogaea*].

Platz, G. A. Durrell, L. W. and Howe, MARY F. Effect of carbon dioxide upon the germination of chlamydospores of *Ustilago zeae* (Beckn.) Ung. *Journal of Agricultural Research*, Washington, D. C., 1927, vol. 34, no. 2, pp. 137-147, fig. 1-3.

Rayner, M. C. Mycorrhiza. *The New Phytologist*, London, 1927, vol. XXVI, no. 1, pp. 22-45, fig. 57, pl. I; no. 2, pp. 85-114, fig. 63-64.

Rivera Campanile, G. Prove sperimentali per la lotta contro la « Cuscuta ». *Bollettino della R. Stazione di Patologia vegetale [di Roma]*, Firenze, 1927, anno VII, nuova ser., n. 1, pp. 46-92, figg. 1-3.

Roach, W. A. Immunity of potato varieties from attack by the

wart disease fungus, *Synchytrium endobioticum* (Schilb.) Perc. *The Annals of Applied Botany*, London, 1927, vol. XIV, no. 2, pp. 181-192, pl. XII-XIII.

Rodionov, Z. Les ennemis de la luzerne en Azerbaïdjan. *La Défense des Plantes*, Leningrad, 1927, vol. IV, no. 1, p. 25-28.

[In Russian, with French title].

Rodionov, Z. Matériaux pour servir à l'étude des ennemis du cotonnier [Première partie: Orthoptères et Lépidoptères]. *La Défense des Plantes*, Leningrad, 1927, vol. IV, no. 1, p. 28-59, fig. 1-7, 1 diagr.

[In Russian, with French title].

Ross, WILLIAM A. The residual insecticidal action of lubricating oil sprays on the pear psylla. *Scientific Agriculture*, Ottawa, 1927, vol. VII, no. 10, p. 395.

[*Psylla pyricola*].

Russell, R. C. A Nematode discovered on wheat in Saskatchewan. *Scientific Agriculture*, Ottawa, 1927, vol. VII, no. 10, pp. 385-386, fig. 1-2.

[This Nematode closely resembles *Heterodera schachtii* Schmidt, but it possibly may be the representative of a new species].

Sahasrabudde, H. L. A remedy for a die-back disease of orange trees. *The Agricultural Journal of India*, Calcutta, 1927, vol. XXII, part II, pp. 114-117, pl. XI-XII.

Sampson, KATHLEEN and Walters Davies, H. The influence of *Tilletia tritici* (Bjerk.) Wint. and *Tilletia laevis* Kühn on the growth of certain wheat varieties. *The Annals of Applied Biology*, London, 1927, vol. XIV, no. 1, pp. 83-104, fig. 1, pl. VI-VII.

Schimitschek, ERWIN. Die Verwendung des Flugzeuges zur Insektenbekämpfung. *Wiener Allgemeine Forst- und Jagd-Zeitung*, Wien, 1927, 45. Jahrg., Nr. 16, S. 93-94.

Schlumberger, OTTO. Über das Verhalten der Kartoffelsorten gegen Schorf. *Mitteilungen der Deutschen Landwirtschafts-Gesellschaft*, Berlin, 1927, XLII. Jahrg., Stück 8, S. 200-202.

[*Actinomyces* spp.].

Schmidt, MARTIN. Zur Entwicklungsdauer der Maikäfer. *Zeitschrift für angewandte Entomologie*, Berlin, 1927, Bd. XII, Heft 3, S. 484-489.

[*Melolontha*].

Seitner, M. Aus der Praxis der Kiefernspinnerbekämpfung. *Zeitschrift für angewandte Entomologie*, Berlin, 1927, Bd. XII, Heft 3, S. 428-435.

[Contains biological data on the following parasites of *Dendrolimus pini*: *Tetrastichus xanthopus*, *Pimpla bernuthi*, *Birpharipa scutellata*, *Monodontomerus dentipes*].

Serbinov, I. Matériaux pour servir à l'étude des bactérioses des plantes et de leur connexion avec le développement du *Macrosporium* Fr. et de l'*Alternaria* Fr. *La Défense des Plantes*, Leningrad, 1927, vol. IV, no. 1, pp. 78-84.

[In Russian, with French title].

Sharp, C. G. Virulence, serological, and other physiological studies of *Bacterium flaccumfaciens*, *Bact. phaseoli*, and *Bact. phaseoli soyense*. *The Botanical Gazette*, Chicago, Illinois, U. S. A., 1927, vol. LXXXIII, no. 2, pp. 113-144, fig. 1-8, pl. VII.

Snapp, OLIVER I., Alden, C. H., Roberts, JOHN W., Dunegan, JOHN C. and Pressley, J. H. Experiments on the control of the plum curculio, brown rot, and scab, attacking the peach in Georgia. *United States Department of Agriculture, Department Bulletin No. 1482*, Washington, D. C., 1927, 32 pp., 10 figs.

[*Conotrachelus nenuphar* Hbst., *Sclerotinia fructicola* (Wint.) Rehm, *Cladosporium carpophilum* Thüm.].

Somerser. Cabbage root fly (*Chorotophila brassicae*, Bouché). *The Gardeners' Chronicle*, London, 1927, vol. LXXXI (third series), no. 2110, pp. 397-398.

Somerser. Raspberry stem-bud moth (*Lampronia rubella*, Bjerk.). *The Gardeners' Chronicle*, London, 1927, vol. LXXXI (third series), no. 2113, p. 452.

Somerser. The celery fly (*Acrida heraclei*). *The Gardeners' Chronicle*, London, 1927, vol. LXXXI (third series), no. 2108, p. 359.

Sprengel, L. Untersuchungen über die Gradation des Heu- und Sauerwurmes (*Clysis ambiguella* Hübn. und *Polychrosis botrana* Schiff.). Problemstellung mit Berücksichtigung prinzipiellen Fragen. *Zeitschrift für angewandte Entomologie*, Berlin, 1927, Bd. XII, Heft 3, S. 435-456, Abb 1-15.

Stark, V. Du développement de *Blutophagus pumipera* L. et de *B. minor* Hart. sur le sapin. *La Défense des Plantes*, Leningrad, 1927, vol. IV, n°1, p. 15-19, 1 fig.

[In Russian, with French title]

Stshelkanovzev, I. Propagation excessive de *Tortrix viridana* L. en 1926 dans les Gouvernements de Voronezh et d'Orel. *La Défense des Plantes*, Leningrad, 1927, vol. IV, n°1, p. 14-15

[In Russian, with French title].

Stshelkanovtzev, I P La lutte contre les insectes nuisibles dans les magasins des chemins de fer du Sud-Est. *La Défense des Plantes*, Leningrad, 1927, vol IV, n°1, p 161-162.

[In Russian, with French title]

Tattersfield, F. and Gimmingham, C. T. Studies on contact insecticides. Part V The toxicity of the amines and N-heterocyclic compounds to *Aphis rumicis* L. *The Annals of Applied Botany*, London, 1927, vol XIV, no. 2, pp 217-239, diagr. 1-6.

Thorne, GERALD. The life history, habits and economic importance of some Mononchs. *Journal of Agricultural Research*, Washington, D. C., 1927, vol. 34, no. 3, pp. 265-286, fig. 1-6.

[The Nematodes of the *Mononchus* genus found in the sugarbeet fields of Utah and Southern Idaho belong to the following species: *M. papillatus* Bastian, *M. macrostoma* Bastian, *M. signatus* Cobb and *M. parabrachyurus* Thorne. These species are of ten found in fields infested by *Heterodera schachtii* Schmidt. *M. papillatus* was frequently seen in the act of eating the larvae and males of *H. schachtii*].

Thrupp, T. C. The transmission of "mosaic" disease in hops by means of grafting. *The Annals of Applied Botany*, London, 1927, vol. XIV, no 2, pp. 175-180, pl. XI.

Traut, I. Rapport sur les travaux d'extermination des Spermothiles dans le Gouvernement de Stalingrad et dans la République des Allemands du Volga en 1926. *La Défense des Plantes*, Leningrad, 1927, vol IV, n°1, p 121-135

[In Russian, with French title].

Traut, I. Rapport sur les travaux d'extérmination des Spermothiles dans les régions pestifères en 1926, exécutés par le Département d'Application du Laboratoire des Recherches Scientifiques du Commissariat d'Agriculture. *La Défense des Plantes*, Leningrad, 1927, vol IV, n°1, pp 136-154.

[In Russian, with French title]

NOTES

Establishment of a new entomological Station in Switzerland.

— This Station, which is attached to the Agricultural School at Chateau-neuf, has been established for research work regarding vine and fruit tree pests, found in the Canton of Valais. In addition to scientific experiments for determining the most effective means of control, the new Station will also be required to diffuse a general knowledge of practical methods of pest control by arranging lectures, courses of instruction at the winter school, the issue of publications, etc.

STATISTICS

Crop prospects and estimates.

Cereals. — Information received at the Institute during November has not modified to any extent the situation as regards the harvests of *wheat, rye, barley and oats*, which remains very much the same as it was last month, when the estimates of the principal producing countries, with the exception of the U. S. S. R. and the Kingdom of the Serbs, Croats and Slovenes were already known. The latter country sent to the Institute during November, preliminary estimates of cereal production for this year which are considerably below last year's. Various countries have modified previous estimates, most of them being reductions, varying in importance. The most important being the reduction of the Canadian estimate for wheat by 400,000 metric tons and for oats by 800,000 metric tons, which was mainly due to damage by bad weather in some districts during harvesting and threshing. These decreases have not had any great effect on world production, the position of which in regard to previous years remains practically the same as last month.

On the other hand, the slight reduction in the total cereal production of the Northern Hemisphere this month (excluding the U. S. S. R. for which no reliable estimates have been received) was compensated for by better news of the cereal crops in the Southern Hemisphere, which both in Australia and Argentina have benefited by heavy rainfall, although it was not general for the whole of their territory.

The crop outlook is good in Argentina although in Australia in spite of a slight improvement in October, a rather poor crop is forecasted.

The new estimates for the production of *maize* in Italy and the Kingdom of the Serbs, Croats and Slovenes confirm the forecast of a very poor European output this year, which will show a deficit of 4.7 million metric tons over that of last year. On the other hand the maize estimate in the United States has been increased from 66.0 million metric tons to 70.0 million metric tons. In spite of this improvement the total maize crop of the Northern Hemisphere (excluding the U. S. S. R. for whom data are lacking) will be below that of 1926 as well as below the averages for the periods 1921-25 and 1909-13.

Production of cereals

(in metric tons).

Crop and countries	1927	1926	Average 1921-1925	Average 1909-1913
WHEAT				
Europe (25 countries)	34,090,000	32,550,000	32,080,000	36,790,000
Canada, United States A. and Mexico	35,990,000	34,090,000	32,350,000	24,450,000
Asia (5 countries)	10,650,000	10,370,000	10,540,000	10,900,000
North Africa (6 countries)	2,940,000	2,480,000	2,500,000	2,570,000
Australia	3,000,000	4,380,000	3,500,000	2,460,000
Totals (40 countries)	86,670,000	83,840,000	80,970,000	76,870,000
RYE				
Europe (23 countries)	20,740,000	18,680,000	19,460,000	24,660,000
Canada and United States A.	1,970,000	1,320,000	2,260,000	970,000
Totals (25 countries)	22,710,000	19,950,000	21,720,000	25,630,000
BARLEY				
Europe (25 countries)	13,740,000	14,060,000	12,880,000	14,560,000
Canada and United States A.	7,900,000	6,270,000	5,850,000	5,010,000
Asia (4 countries)	2,700,000	3,050,000	2,810,000	2,660,000
Africa (6 countries)	2,050,000	1,510,000	2,000,000	2,230,000
Totals (37 countries)	26,390,000	24,890,000	23,540,000	24,460,000
OATS				
Europe (24 countries)	24,520,000	25,180,000	21,690,000	25,860,000
Canada and United States A.	24,480,000	24,050,000	26,540,000	22,020,000
Africa (3 countries)	230,000	170,000	240,000	260,000
Totals (29 countries)	49,230,000	49,400,000	48,470,000	48,140,000
MAIZE				
Europe (10 countries)	11,660,000	16,300,000	12,180,000	14,630,000
Canada and United States A.	70,050,000	67,430,000	72,750,000	69,340,000
Totals (12 countries)	81,710,000	83,730,000	84,730,000	83,970,000

Cereal production, summarised as usual according to continent, is shown in the preceding table. The totals comprise all cereal producing countries excepting the U. S. S. R., Argentina and a few minor countries of secondary importance.

*Percentages of the 1927 production compared with that of 1926
and with the averages shown.*

	1926 = 100	Average 1921 to 1925 = 100	Average 1909 to 1913 = 100
Wheat (40 countries)	108.4	107.0	112.7
Rye (25 ")	113.8	104.6	88.6
Barley (37 ")	106.0	112.1	107.9
Oats (29 ")	99.7	101.6	102.3
Maize (12 ")	97.6	96.2	97.3

In regard to the *sowing of winter cereals*, for the season 1927-28 in the Northern Hemisphere the weather, in Europe generally, during most of October was favourable to work in the fields and sowing. However, in the North of Europe on account of bad weather last month, which delayed harvesting and also owing to excessive moisture in the heavy soils, work at the end of October was still rather behind. In some of the southern zones more rain is needed. Where the seeds have already sprouted, they generally look well, and their condition is somewhat better than at the same time last year. In the United States, also, the weather up to the present has been favourable to seeding operations and to the germination of winter cereals, and only in some districts is heavy rain needed.

Potatoes. — In the following table the figures for *potato* production in the Northern Hemisphere are given.

The estimates available which comprise $\frac{2}{3}$ of the world's production not only confirm the forecast of an abundant crop, but also exceed the early estimates.

Potato production this year is 23 % higher than the relatively poor year 1926, and 12 % higher than the average 1921-1925 and the prewar average 1909-1913. In fact this year's output as far as concerns quantity can be classed with the record years 1922 and 1925. The favour-

Production of potatoes

(in metric tons)

Countries	1927	1926	Average 1921 to 1925	Average 1909 to 1913
Europe (20 countries)	117,400,000	94,000,000	108,100,000	104,800,000
Canada and U S A	13,100,000	11,900,000	13,800,000	11,900,000
Totals (22 countries)	130,500,000	105,900,000	116,400,000	116,700,000

erable season and an increased area planted in the most important producing countries (Germany, Poland, France and Czechoslovakia) were the main factors contributing to these good results.

However, potatoes were not altogether immune from disease, on account of heavy rain in many regions during August and September so that the quality on the whole is not considered very satisfactory, although they improved in many zones during October, which on the whole was favourable to the cultivation of potatoes. In order to complete the table, data from the U. S. S. R. and several smaller producers are needed. It is forecasted that the crop in the former will be of average quality and considerably smaller than that of 1926.

Sugar Beet and Beet Sugar. — Although unseasonable weather during the summer was not very propitious for the cultivation of *sugar beets* in various European countries, better weather during the final stage of growth improved the outlook in the principal producing centres so that production is higher than last year in Germany (8 %), Czechoslovakia (14 %), France (15 %), Poland (19 %) and Belgium (17 %). The increased production of the U. S. S. R. (61 %) is particularly noticeable. It will be observed that although the area under sugar beet was higher than in 1926 the increase in production was proportionally greater. Less favourable results were shown by several other countries (particularly Spain, Hungary, Netherlands and Italy) partly due to a reduction in area and partly owing to an unfavourable season. According to figures so far received at the Institute, which comprise about 90 % of the world's production, the output of sugar beet this year will be 16.5 % higher than last year and 33.1 % higher than the average for the previous five years. When the U. S. S. R. is not included this increase is less, being 9.8 % higher than last year and 18.7 % higher than the average for the previous five years.

Production of Sugar-beet

(in metric tons)

Countries	1927	1926	Average 1921/25	Average 1909/13
Europe not including U. S. S. R. (14 countries)	37,300,000	33,800,000	31,100,000	31,200,000
U. S. S. R.	9,900,000	6,200,000	3,400,000	8,900,000
Canada and U. S. A	7,500,000	7,000,000	6,600,000	4,600,000
Totals (17 countries)	54,700,000	47,000,000	41,100,000	45,700,000

On the basis of sugar production estimates, received from the various governments and in some cases from sugar associations, the production of beet sugar in Europe (excluding France and England and Wales for

which data are lacking) and in the United States is estimated as follows :—

Productions of Beet Sugar

(in metric tons)

Countries	1927-28	1926 27	1921-22 to 1924-25	1909-10 to 1913 14
Europe not including U. S. S. R. (18 countries) .	5,400,900	5,022,600	4,576,200	5,612,300
U. S. S. R.	1,318,600	873,400	411,700	1,434,800
United States	1,056,700	968,000	933,900	628,500
Totals (20 countries) . .	7,776,200	6,864,000	5,921,800	7,675,600

The totals which comprise a group of countries producing nine-tenths of the world's sugar beet, show an increase over last year of 13.3 % and of 31.3 % over the previous five year average. Excluding the U. S. S. R. the increase amounts to 7.8 % and 17.2 % respectively.

Wine. — A table of *wine* production, sufficiently exact can not be given yet, as only a very small number of countries have so far published figures on the results of the vintage. Neither France nor Italy who are the two principal wine producing countries are among them. It is well known that neither of these countries secured the good results they expected after the poor vintage of last year and that the production of both will be below the average. From unofficial sources in France it is gathered that production will be from 40 to 50 million of hectoliters against 43 million in 1926 and an average of 64 million of hectoliters for the period 1921-25. In Italy the harvest of grapes was almost the same as last year although of better quality, and wine production will only be slightly higher than that of 1926 which was 37 million of hectoliters compared with an average of more than 42 million of hectoliters for the period 1921-25. Outside of the good crop in Spain and Portugal, almost all the other European countries report poor or mediocre results. In North Africa altogether the production of Morocco, Tunis and Algeria only exceeds that of 1926 by very little but is slightly below the average.

Olive oil. — Although the estimates of some important *olive* growing countries such as Italy, Tunis and Portugal have not yet been published, some idea of the probable world's olive oil production is given by the estimate of the Spanish crop which the government puts at 546,600 metric tons. Providing the adverse weather during November, which is a particularly delicate period in olive cultivation, does not noticeably reduce the Spanish estimate, it will turn out to be a most exceptional crop, and will considerably surpass the highest figures yet reached in Spain (422,000 metric tons in 1911; 428,000 metric tons in 1917).

Even allowing that most of the olive oil producing countries calculate on a year of minimum production around 300,000 metric tons of oil, and also that the olive crop of these countries although not generally abundant, will certainly be better than during the poorest years, the world's olive crop this year should be the highest on record. According to news arriving while going to press, the harvest in Portugal will also be very abundant.

The estimates so far to hand are given in the following table, as compared with those of 1926 and the averages for the periods 1921-25 and 1909-13

Production of olive oil.

(in metric tons)

Countries	1927	1926	Average 1921-1925	Average 1909-1913
Spain	546,600	230,100	305,400	219,700
France	8,500	7,500	9,600	9,000
Greece	68,700	57,900	70,100	82,500
Algeria	18,000	10,100	27,500	28,400
French Morocco	11,000	2,000	7,900	2,600
Total	652,800	337,600	420,200	342,800

Linseed — The data available on the production of *linseed* are given in the following table

Production of Linseed

(in metric tons)

Countries	1927	1926	Average 1921-1925	Average 1909-1913
Europe (8 countries)	150,000	150,000	130,000	130,000
Canada and United States A	740,000	620,000	630,000	800,000
India	410,000	410,000	430,000	500,000
Totals (11 countries)	1,300,000	1,180,000	1,190,000	1,430,000

Although these totals comprise the principal producing countries of the three continents, they cannot however give an exact idea of the probable results of world production, as the U. S. S. R. figures are not included, nor those of Argentina which has recently become the most im-

portant supplier of this product, in as much as it produces about half of the total world output. The totals show a certain increase in production this year compared with last year and with the average for the period 1921-1925, although still somewhat below the pre-war average. The increase is practically entirely due to increased production in North America which was obtained from an area slightly smaller than last year's. It will be easier to ascertain more exactly the world's production about the middle of next month, when the Argentine estimates will be known. In Argentina the crop was rather damaged by drought but mostly recovered following the heavy rainfall of October. According to the official report of the Argentine Government dated 15th November the crop condition was considered generally good.

International Trade.

SURPLUS QUANTITY OF IMPORTS (+) OR OF EXPORTS (—)

Countries	Wheat (August)		Wheat flour (August)		Rye (August)		Barley (August)		Oats (August)	
	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926
	metric tons		metric tons		metric tons		metric tons		metric tons	
Germany	173,678	346,589	1,712	16,298	18,867	49,757	93,867	103,648	34,292	73,776
Austria	18,916	34,533	11,623	11,523	7,182	14,043	519	2,911	6,444	7,967
Belgium	98,062	98,062	3,563	3,563	2,901	1,686	13,191	11,121	1,537	10,716
Denmark	5,677	6,258	3,563	3,563	9,266	9,866	3,657	4,183	1,619	430
Spain	1,747	1,131	531	456	1,428	6,525	0	352	0	296
Estonia	2	76,012	7,018	8,070	4,191	10,806	0	66	66	439
Finland	209,985	533,241	23,320	26,497	2,925	441	2,937	397	8,503	5,439
Gr. Brit. and North. Ireland	532,165	70,464	18,233	17,275	15,996	29,079	6,046	64,971	40,127	36,915
Hungary	35,433	106,963	10,127	9,783	—	—	0	35	4,337	3,298
Italy	10,317	106,963	1,155	1,352	45	1,108	1,438	783	1,469	182
Latvia	2,024	4,354	20	382	2,814	1,103	1,688	789	14,711	5,540
Lithuania	0	73	0	1	171	292	171	19	945	109
Norway	8,599	6,606	6,130	1,466	9,607	15,744	1,794	1,091	2,965	2,293
Netherlands	42,044	49,802	9,375	8,210	8,432	8,081	10,763	33,151	8,390	9,643
Poland	1,145	6,608	678	722	9,687	23,626	1,317	9,890	749	2,113
Rumania	29,292	24,180	5,023	6,375	4,534	2,644	182,195	61,784	3,020	1,116
Kingdom of the Ser. Cr. and Slov.	5,333	34,498	617	3,396	71	592	278	3,252	712	786
Sweden	20,411	15,185	853	137	1,560	1,560	3,794	51	2,684	1,777
Switzerland	39,473	12,484	—	—	14,336	969	2,673	2,673	12,758	13,236
Czechoslovakia	37,835	56,583	16,330	6,201	0	5,671	6,619	34,523	186	0
U. S. S. R.	0	—	—	—	—	—	—	—	—	—
Canada	331,807	259,482	45,181	40,510	4,042	9,464	36,985	56,407	3,068	16,881
United States	614,052	772,843	93,607	121,147	33,423	7,975	98,500	33,159	20,006	4,669
Argentina	144,905	52,333	11,608	12,962	3,573	5,314	4,185	4,151	16,865	21,804
Chile	66	17	68	296	—	—	0	10,224	56	4,027
Ceylon	6	6	1,907	1,817	—	—	20	98	59	116
India	33,110	25,828	3,827	4,468	—	—	3,516	1,266	0	73
Indochina	2,454	0	0	0	—	—	0	—	0	—
Japan	16,972	19,827	4,743	9,837	—	—	—	—	—	—
Syria and Lebanon	1,436	1,947	1,178	1,905	—	—	5,704	506	0	21
Algeria	12,802	10,547	674	891	573	—	25,940	598	13	406
Egypt	1,905	107	11,061	12,785	—	—	1,476	2,537	—	—
Tunis	2,541	6,947	104	9	—	—	3,711	15,319	167	4,367
Union of South Africa	—	—	—	—	—	—	—	—	—	—
Australia	65,773	5,507	32,988	28,480	—	—	1,549	1,796	682	50
New Zealand	1	5,088	765	3,163	—	—	295	27	2,417	64
Total of imports	1,345,906	1,380,272	106,196	118,226	136,205	126,587	206,482	320,421	142,026	168,283
Total of exports	1,294,349	1,321,895	220,846	250,254	62,011	53,895	316,696	236,393	55,474	50,308

SURPLUS QUANTITY OF IMPORTS (+) OR OF EXPORTS (-)

Countries	Maize		Wheat		Rice		Tea		Coffee	
	(November 1-Aug. 31)		(January 1-Aug. 31)		(July 1-Aug. 31)		(July 1-Aug. 31)		(July 1-Aug. 31)	
	1936-27	1935-26	1937	1936	1937	1936	1937	1936	1937	1936
Germany	1,631,034	480,406	258,185	227,037	136,705	110,922	1,195	1,091	29,295	24,950
Austria	1,190,940	157,226	105	165	17,545	16,524	46	31	2,344	81,088
Belgium	643,958	487,224	57,115	61,278	30,843	25,113	46	31	2,344	81,088
Denmark	702,968	341,282	10,105	10,290	3,901	3,490	65	98	4,244	4,172
Spain	112,539	200,554	2,235	3,972	15,905	21,618	1,245	11	18	23
Estonia	0	266	650	3,290	0	1,545	9	17	2,834	2,344
Finland	2,327	1,159	3,552	3,290	98,563	117,816	150	367	23,552	81,088
France	1,527,651	478,579	107,783	127,718	17,545	16,524	30,843	28,801	2,344	81,088
Gr. Brit. and North. Ireland	643,958	487,224	57,115	61,278	30,843	25,113	46	31	2,344	81,088
Hungary	1,190,940	157,226	105	165	17,545	16,524	46	31	2,344	81,088
Irish Free State	304,195	265,844	1,910	1,903	1,593	1,397	1,255	1,227	35	33
Italy	314,164	435,873	48,250	42,905	136,506	110,048	12	24	7,779	6,913
Latvia	102	151	307	254	1,495	1,598	14	17	25	23
Lithuania	117,157	96,863	7,945	4,574	1,558	1,174	10	14	25	27
Norway	1,190,940	157,226	105	165	17,545	16,524	46	31	2,344	81,088
Netherlands	1,190,940	157,226	105	165	17,545	16,524	46	31	2,344	81,088
Poland	1,190,940	157,226	105	165	17,545	16,524	46	31	2,344	81,088
Rumania	1,190,940	157,226	105	165	17,545	16,524	46	31	2,344	81,088
Kingdom of Ser., Cr. and Slov.	1,190,940	157,226	105	165	17,545	16,524	46	31	2,344	81,088
Sweden	1,190,940	157,226	105	165	17,545	16,524	46	31	2,344	81,088
Switzerland	1,190,940	157,226	105	165	17,545	16,524	46	31	2,344	81,088
Czechoslovakia	1,190,940	157,226	105	165	17,545	16,524	46	31	2,344	81,088
U. S. S. R.	3,150,645	3,150,645	1,296,438	1,293,916	12,105	10,105	49	40	6,790	10,924
Canada	327,777	230,636	33,185	19,069	12,962	18,908	93	97	1,995	1,995
United States	296,068	543,019	402,025	392,825	94,446	28,383	7,015	5,562	1,916	1,067
Argentina	6,790,375	3,150,645	1,296,438	1,293,916	12,105	10,105	49	40	6,790	10,924
Chile	—	—	—	—	—	—	—	—	—	—
Ceylon	—	—	—	—	13,250	13,649	403	278	928	713
India	51	124	—	—	325,324	324,952	16,595	18,205	379	305
Dutch East Indies	32,733	43,865	134,600	111,957	1,802,140	1,950,357	33,397	54,024	17	22
Indochina	54,428	36,382	—	—	43,102	225,533	9,007	7,171	9,001	5,962
Japan	31,130	18,735	4,968	5,351	1,130,320	1,104,944	460	381	15	15
Syria and Lebanon	2,099	1,352	—	—	498,791	235,076	3,402	4,387	231	148
Algeria	11,223	1,693	—	—	9,405	9,430	3	5	101	78
Egypt	7,146	8,389	29	45	6,624	9,238	101	138	1,653	1,544
Tunis	10,877	4,149	40	84	8,041	28,655	170	203	1,700	1,544
Union of South Africa	33,350	377,079	600	511	759	580	141	203	1,700	1,544
Australia	15,504	42,471	13,959	16,928	30,788	26,691	845	781	2,411	1,967
New Zealand	2,451	4,763	250	942	16,911	6,258	3,502	253	69	26
Total of imports	8,492,089	5,870,591	1,466,579	1,433,905	1,540,525	1,514,877	52,809	52,490	216,508	210,483
Total of exports	9,183,660	5,834,210	1,476,178	1,431,606	3,196,448	3,195,967	62,391	64,797	—	—

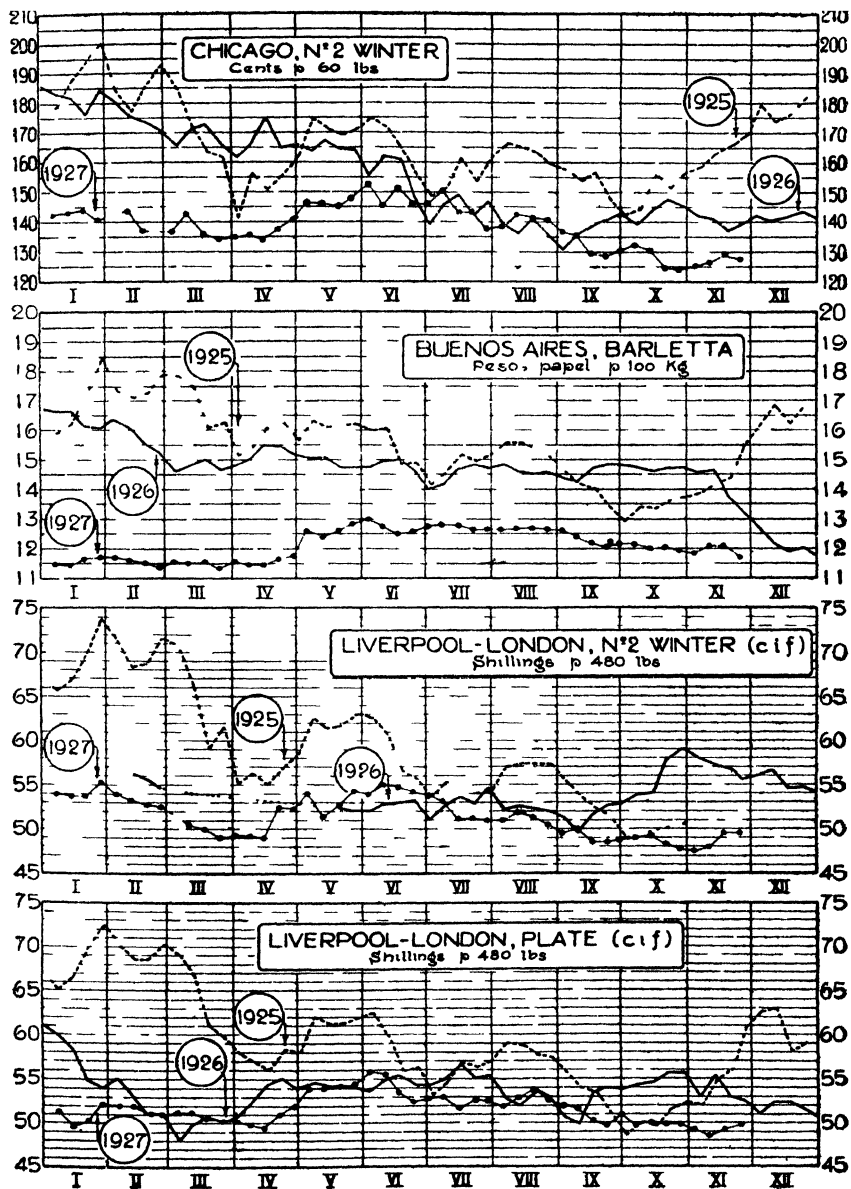
(1) October-August. — (2) Five months. — (3) Three months.

SURPLUS QUANTITY OF IMPORTS (+) OR OF EXPORTS (—)

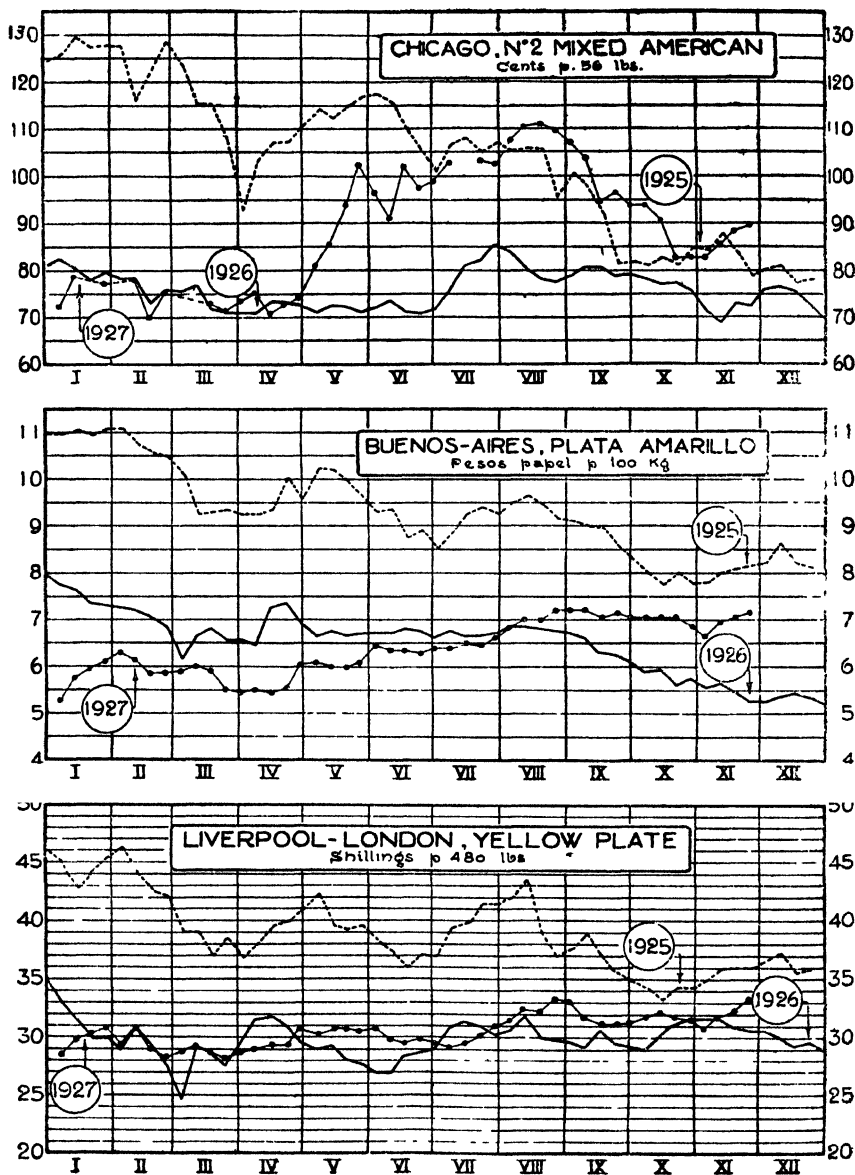
Countries	Butter (January 1-August 31)		Cheese (January 1-August 31)		Cotton (August)		Wool (September 1-August 31)	
	1927	1926	1927	1926	1927	1926	1926-27	1925-26
	metric tons	metric tons	metric tons	metric tons	metric tons	metric tons	metric tons	metric tons
Germany	68,538	62,940	45,898	39,047	16,399	14,140	190,105	196,551
Austria	1,498	1,374	2,210	2,200	2,947	1,500	6,717	7,217
Belgium	1,385	1,385	10,322	9,391	6,477	6,745	96,554	39,132
Denmark	96,741	89,741	3,134	4,666	209	470	1,175	860
Spain	(—)	33	693	513	26,820	66,643	983	3,483
Sweden	5	5	(—)	(—)	449	267	(—)	235
Finland	6,183	5,724	1	1,666	1	267	1,396	1,035
France	17,701	10,042	2,229	1,826	15,154	14,562	293,560	903,282
Great Britain and Northern Ireland	200,083	203,185	97,946	106,766	20,396	30,022	193,085	198,085
Hungary	218	166	165	370	574	370	6,748	4,411
Italy	10,521	12,215	630	725	11,908	21,753	35,753	45,694
Irish Free State	990	2,013	15,373	17,563	137	69	491	499
Latvia	6,979	7,079	4	375	—	—	122	249
Lithuania	1,380	1,181	384	375	292	106	336	238
Norway	629	365	171	99	2,553	1,731	3,443	3,828
Netherlands	32,868	29,739	64,423	53,139	6,131	6,623	17,299	6,089
Poland	4,690	3,455	693	984	0	146	76	611
Romania	207	64	539	202	835	559	4,147	3,374
Kingdom of the Serbs, Croats and Slovenes	207	207	1,313	349	685	559	5,223	6,039
Sweden	12,952	10,247	333	349	1,989	1,061	1,061	9,125
Switzerland	5,297	6,473	22,435	15,341	1,989	1,061	1,061	9,125
Czechoslovakia	683	276	1,599	1,840	12,541	3,692	14,632	13,558
U. S. S. R.	23,153	20,941	—	—	—	—	—	—
Canada	2,876	2,081	20,277	26,745	3,396	2,332	3,350	3,919
United States	1,805	49	21,305	16,049	74,413	89,307	117,997	138,366
Argentina	13,143	16,226	—	—	—	—	156,202	149,498
Chile	—	—	446	197	—	—	11,677	11,013
Ceylon	198	174	59	45	75	53	96,581	30,530
India	60	112	327	276	30,530	78,965	40,969	29,701
Japan	199	246	28	37	85,027	44,582	3,325	2,706
Syria and Lebanon	998	577	37	20	11	1	—	—
Algeria	697	490	2,101	1,790	378	38	6,121	9,418
Egypt	731	844	1,830	1,978	21,471	15,623	1,908	1,140
Tunis	171	149	358	285	—	—	156	215
Union of South Africa	177	53	56	65	389	529	106,943	93,744
Australia	15,955	22,161	832	1,162	111	66	350,128	365,630
New Zealand	45,551	36,060	57,042	55,052	—	—	100,007	97,154
Total of imports	286,369	277,809	190,481	181,139	167,820	218,668	992,027	952,016
Total of exports	—	271,276	190,608	179,701	127,248	170,419	773,960	755,540

(1) Three months — (2) Eight months — (3) Seven months

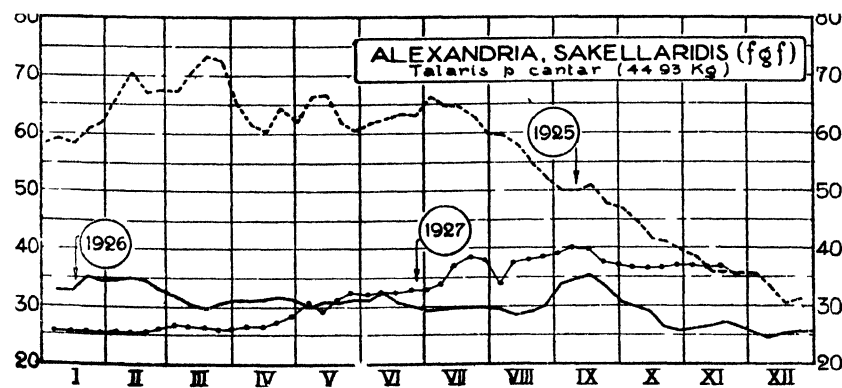
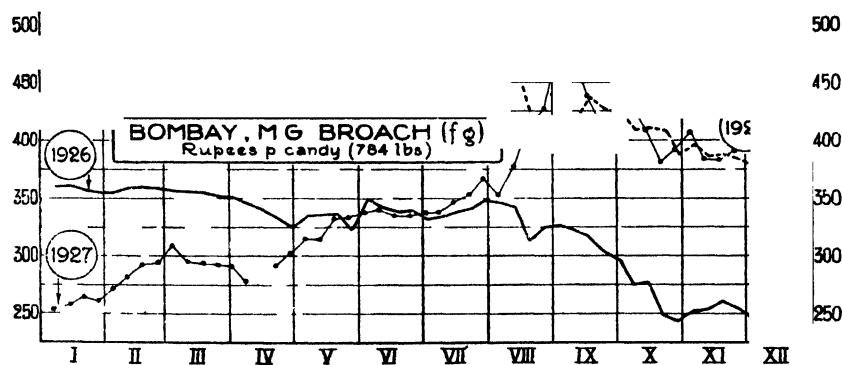
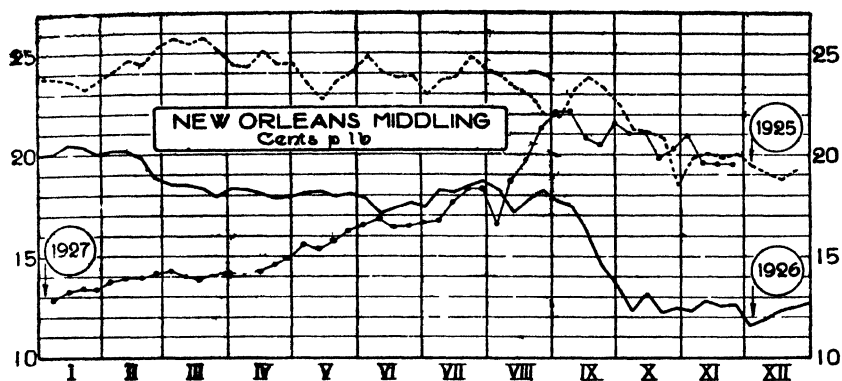
Prices of Wheat.



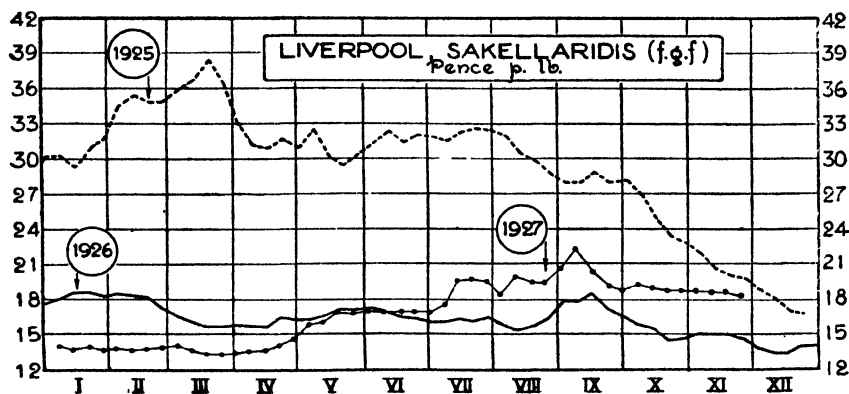
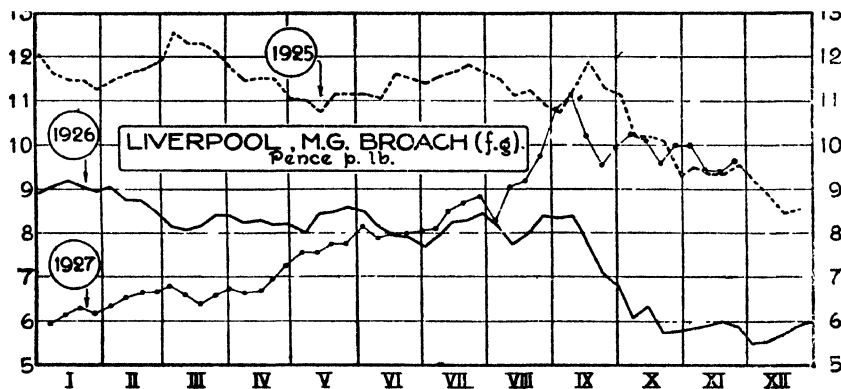
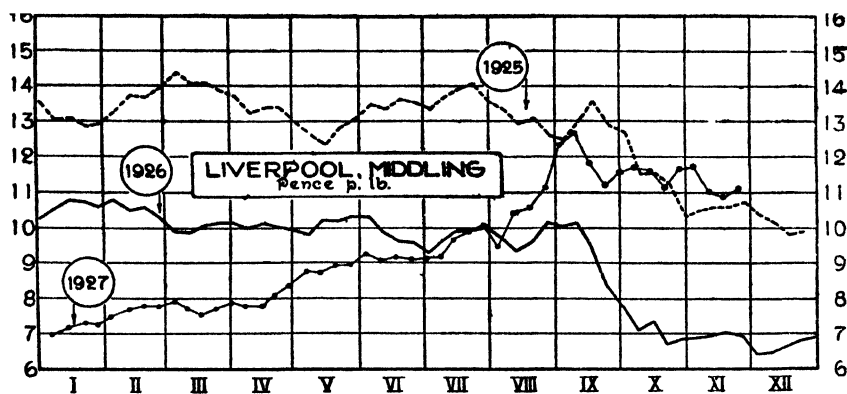
Prices of Maize.



Prices of Cotton.



Prices of Cotton.



AGRICULTURAL LEGISLATION

Chile. — A Decree No. 1849 of 25 February 1927 (*Diario Oficial*, No. 14,898 of 10 October 1927) with a view to facilitating the development of foreign trade, has organized a Department of Trade with the following attributions and functions: —

(a) study the national production, home consumption and exportable residues; supply of raw materials and exportation products; persons and institutions interested in the trade in the various products;

(b) study the markets for the consumption of national products at home and abroad;

(c) study the improvement of means of transport;

(d) study the commercial legislation in force in countries which have trade relations with Chile, etc.;

(e) promote mutual acquaintance between merchants, producers and consumers;

(f) study the commercial laws and customs of the country and propose the most suitable measures for facilitating trade credit, the formation of co-operative societies of producers, consumers, exporters, etc.;

(g) analyze commercial treaties and propose measures for improving them and for establishing new ones, etc., etc

France. — An Order of 7 October 1927 (*Journal officiel*, No. 241, of 16 October 1927) regulates the cheese trade, with a view to establishing the descriptions and particulars given to cheeses offered for sale, so as to avoid all possibility of confusion as regards the species and origin of these products. With this object the Order obliges all persons offering for sale cheeses with a geographical indication of the species on the labels or contained in inscriptions stamped on the cheeses, to add to it the department or region where these cheeses were manufactured. This statement must be drawn out as follows: — “*Manufactured in (name of department or region)*” and in letters at least equal to two-thirds the size of the letters composing the name of the species and similar in printers’ type. These provisions are not however applicable to geographical titles of origin established by custom either by special laws or by judicial decision rendered in application of the Law of 6 May 1919 on the protection of titles of origin. It is also laid down that these provisions shall come into force six months after the date of the publication of the Order in the *Journal Officiel*.

*** An Order of the Ministry of Commerce and Industry of 18 October 1927 (*Journal Officiel*, No. 246, of 22 October 1927) authorizes the Chamber of Commerce of Mulhouse to open in the town a Public Bureau for grading wool, silks, cottons and other textiles, and approves the statutes of the Bureau. The Grading Bureau effects all operations connected with the standardization weighing and analysis of textiles, whether in raw condition or made up.

These operations are optional as far as concern commerce and industry. On written application signed by one of the contracting parties there shall be admitted for grading: (1) silks of all descriptions; (2) raw, scoured and combed wool; (3) combed wool threads on bobbins or wound off; (4) carded and scoured threads; (5) mixtures of silk and wool, wool and cotton, cotton and silk; (6) raw cotton or yarn, single or twist.

An official bulletin, drawn out in double copy, and containing the results of the grading, is delivered to the sellers and purchasers concerned.

Regency of Tunis. — A Decree of 20 September 1927 (*Journal Officiel Tunisien*, No. 79 of 1 October 1927) suspends on and from 1 October 1927 prohibitions on exportation issued by the Decree of 12 September 1919 and 2 March 1923, for sugars and molasses.

Canada (Dominion) — Regulations respecting fruit exportation were published on 18 August 1927 (*Canada Gazette*, No. 15 of 8 October 1927). Henceforth it shall be unlawful for any person to export from Canada fresh apples, pears and plums unless they have been inspected and a certificate issued that they fulfil all the conditions laid down by the law, and belong to the category designated. According to these regulations it shall be incumbent on the possessors of fruits intended for exportation to notify an authorized inspector or the Fruits Commissioner so that the inspection can be effected within the period established for this purpose. The inspection in question must be effected at the time of packing and the certificate delivered in four copies. These Regulations contain also precise directions as to the place and time of inspection. They shall also indicate the procedure to be followed with respect to the fruit lots found to be inferior to the category designated, the obligations and duties of the owner, the consignor or his representative, as well as the amount of the dues payable for the inspection and the exportation permit.

Italy. — The Royal Decree of 17 November 1927, No. 2172 contains the Regulations for carrying out the Law of 23 June 1927, No. 1272 and the Decree-Law of 12 August 1927, No. 1756 with respect to the national exportation mark for fruits, citrus fruits and horticultural products intended for abroad. The Regulations are divided into seven sections, dealing respectively with the authorization to use the mark, the obligations incurred by persons using the mark, the working of the Commission and Committee of Appeal with sanctions, supervision and control, the tax on exportation of orchard products, and lastly final and transitory provisions. As regards the first point, it is laid down that any person who wishes to be authorized to use

the mark must make application to the National Exportation Institute, annexing the prescribed documents. The application with the documents must be presented to the competent Provincial Office of Economy, which shall forward them with its opinion to its National Exportation Institute. If the Institute grants the application, the authorization is communicated to the Provincial Bureaux of Economy at the exporter's place of residence and also to the Ministries of Finance and of Economy and to the provincial federations of agriculturists and merchants; the authorization shall also be published at home and abroad by the Institute. Bankruptcy, retirement from business and transfer of the exploitation *inter vivos* shall involve forfeiture of the right to use the mark. As regards the second point, it is laid down that merchandize supplied with the mark may not contain on the outside of the packings any indications other than those prescribed by the special technical provisions specified in art. 17 of the Law of 23 June 1927, No 1272. The third section contains rules respecting the formation of the Commission and Committee of Appeal and lays down the procedural provisions. Penalties on infractions are laid down in the fourth part; the fifth deals with supervision and control confided to a body of inspectors appointed by the Institute. The collection of the tax laid down by art. 11 of the Law of 23 June 1927 forms the subject of the sixth part which prescribes that the payment shall be effected by the Customs Bureaux. The seventh part deals with final and temporary provisions.

Grand Duchy of Luxemburg — An Order of 19 November 1927 (*Mémorial du Grand-Duché de Luxembourg*, No. 65 of 26 November 1927), deals with the sale of butters and feeding fats (margarines). The new provisions prohibit the mixing of butter with margarines or feeding fats prepared with a view to commerce.

The Order in addition contains exact information respecting the content and composition of margarine and artificial fats.

Mexico — An Order of 21 September 1927 (*Diario Oficial*, No. 26, 15 October 1927) with the object of furnishing an official basis for the classification of Mexican Cottons and grading their quality and value, authorizes the Ministry of Agriculture and "Fomento" (Development) to establish "Official Standards of Mexican Cotton".

The Ministry is alone authorized to prepare and distribute the cases containing the official standards of Mexican Cotton, certifying them with his seal, and fixing the conditions of sale, inspection and annulment. The effect of any change of standard shall only be calculated as from the second harvest after the date when the change was effected.

The official standards shall include cotton both as lint and unginned.

Disputes between individuals as regards the classification of cotton may be subjected to examination by the Juntas of revision and arbitration, which shall be established and shall act in accordance with regulations issued by the same Ministry. The classification decisions of the Juntas shall be without appeal and the parties concerned must declare in advance their willingness to accept the decision.

Private individuals may obtain on application classification certificates delivered by classifiers authorized by the Ministry. The latter shall for this purpose issue a licence of competence as cotton classifier; this licence is renewable every year for persons of Mexican nationality, who shall have been approved by a special commission of examination appointed by the General Department of Agriculture and Stock Breeding.

**. There was published in the same number of the *Diario Oficial*, dated 29 September 1927, the Regulations of the above Decree, issued in pursuance of art. 11, pr. 1.

The Regulations contain the definition of "Official Standards of Mexican Cotton" by which shall be understood the models for the types, length of fibres, colours and other characteristics, authorized by the Ministry of Agriculture and "Fomento" as a basis for classifying cotton produced in the country.

Each case of "Official Standards of Mexican Cotton" must be sealed by the Ministry and must contain the necessary number of cotton samples which constitute a type. Each case shall be valid for eighteen months, and on expiry of this period shall be considered obsolete without necessity of special declaration. Purchasers of such cases are subject to periodical inspection by the General Department of Agriculture and Stock Breeding.

Change of "standards" may be effected when new technical studies effected by the Ministry of Agriculture show the necessity for this change or when such change is necessitated by the data collected on cotton production.

The Regulations also define that by "cotton sample" shall be understood the small portions of cotton of the bale from which it has been taken. These portions of fibre must be removed from both sides of the bale and must weigh approximately 150 grams. If the sample on one side is found to be of a type or length inferior to the sample of the opposite side, the cotton of the bale shall be classified on the basis of the inferior type and the shorter length of the fibre.

The classification certificates which can be given by the authorized classifiers are of four categories. Certificate A, which is issued by an authorized classifier on the basis of samples taken by the party interested and serving for his personal use. This certificate is not subject to revision. Certificate B, which is delivered by an authorized classifier, on the basis of a sample taken personally by him or in his presence. This certificate B is subject to revision. Certificate C, which is issued as a result of the revision of the original certificate B; Certificate D, which is issued with respect to samples taken by the representative of the Ministry, by the Junta of Revision and Arbitration. The classification and decision of this Junta is not open to appeal.

The Regulations contain in addition detailed provisions respecting the basis and procedure of classification, the procedure for obtaining classification certificates, the tariff of certificates, the issue of licenses of authorized classifiers, etc.

AGRICULTURAL ASSOCIATIONS

GENERAL NOTICES

Guatemala. — CONFEDERATION OF AGRICULTURAL ASSOCIATIONS. — The Departmental and Regional Associations of Guatemala have lately formed a Confederation of the Agricultural Associations of the Republic with a view to the fulfilment of the objects with which they were founded.

Associations belonging to the Confederation retain their self-governing powers in their own area, whether regional or departmental, but on questions of general interest are expected to follow the lines laid down by the Confederation, and the Confederation has also the duty to intervene in any disputes that may arise among the Associations.

The general object of the Confederation is to promote agricultural improvement and increased production, and to protect by all legal means the interests of farmers. It will also undertake to distribute books, periodicals and pamphlets dealing with the problems of agriculture, to arrange provident funds, etc. for the assistance of farmers and to establish schools for instruction in agriculture.

The Confederation will also be required to establish experimental farms, central and regional exhibitions, award prizes to inventors, introduce the use of improved machinery and selected seeds, and arrange for the importation of selected breeding stock.

The Confederation will also be empowered to encourage the establishment of new agricultural associations, with the object of ensuring the representation of all the farmers of the country on and by the Confederation.

An even more important function of this new organisation is that of handling the agricultural statistics of Uruguay, publishing meteorological observations, notes on markets and other information of value to farmers.

The Confederation will present to the Government all such recommendations as it considers to be of advantage to the national agriculture and in accordance with the interests of the farmers. It will maintain relations with other similar associations, whether in Uruguay or in other countries.

The terms of constitution of the Confederation provide for the establishment of an agricultural review as the official organ of the Confederation, and also for the formation of a Museum of agricultural products, and for the develop-

ment of a scheme for the formation of a Faculty of Agriculture on a practical basis.

All members of the confederated associations are members of the Confederations. There are five classes of members: *foundation members* or landowners already belonging to one of the associations forming the Confederation; *subscribing members* who although not landowners pay a fixed contribution; *ordinary members*, i. e., share tenants, farm workers and job labourers; *corresponding members*, i. e., the members of the executive bodies of similar associations of Central America. On the other hand, *honorary members* will be appointed by the Confederation from among persons of eminence, who have rendered valuable services to the Confederation. All members, whether nationals or foreigners, must be of full age.

The Confederation is administered by a Central Administrative Council, consisting of ten directors and ten proxies, who are elected by the General Council of the Confederation for the period of one year.

Each director acts in turn as Chairman and the General Secretary of the Confederation acts as Secretary of the Central Administrative Council.

CURRENT NOTICES

AGRICULTURAL INSTRUCTION AND EXPERIMENT.

A New Institute for Plant Genetic Research in Berlin. — The "Emperor William Society" ("Kaiser Wilhelm Gesellschaft") has decided to establish this Institute, which will be situated in the East of Berlin, under the direction of the well known genetist, Prof ERWIN BAUR of Berlin-Dahlem. The object of the Institute will be to carry out the preliminary research work, now regarded as of such paramount importance, for the improvement of cultivated plants (*Mitteilungen der Deutschen Landwirtschaftsgesellschaft*, Berlin 1927, Jahrg XLII, Stuck 18)

A new Technical Process for the Preservation of the Characteristic and Natural Aspects of Plant and Animal Specimens. — Prof. HOCHSTETTER, of Vienna University, has invented and put into practical use a process which will be of the greatest use for teaching purposes, especially in agricultural schools. It will have the advantage of replacing the usual stuffed animals and will be equally useful for scientific research. The process consists in saturating the specimens with paraffin, by injection into the blood vessels. Following this process, Prof HOCHSTETTER has already prepared several specimens with excellent results (*Die Umschau*, XXXI Jg, Heft 32; 1927)

An American Institute of Baking. — Under the patronage of the "American Bakers' Association", a great Institute has been founded in New York, known as the "American Institute of Baking", with the object of carrying on studies and researches on a considerable scale relating to the scientific, technical and commercial aspects of the milling, baking and cognate industries. It further proposes to train a highly efficient staff of specialists for these industries. The Institute has three departments; the bakery school, studies and research, propaganda on food questions.

The courses given in the "School of Baking" are short but very thorough, and aim at giving students not only the technical knowledge necessary for practical application in industry and commerce, but also the scientific ideas underlying modern industrial technology and modern food theories.

These courses include the following: (1) The practical management of a bakery; (2) Bread-making and similar experiments; (3) Problems of production; (4) General Science; (5) Baking materials; (6) Chemical analyses;

(7) Biology, Ferments, Bacteria, Moulds ; (8) Principles of feeding and the nutritive value of bread.

Besides these regular courses, special lectures are held on other important subjects, such as legislative measures on food substances, sanitary regulations, hygiene, selling problems, commercial associations, etc. Bakeries, mills and kindred establishments are also visited.

The "Research Department" possesses well-equipped laboratories for experimental work in physics, chemistry and biology. Among the subjects studied in 1926 may be mentioned "the quantitative and qualitative consumption of bread in relation to a suitable alimentary ration". Special researches were also made on so-called milk breads. In addition studies are being made on the biological value of bread proteins, sandwich making, and on the possibility of standardizing the various methods of analysis used in the baking industry.

The propaganda work carried on by the "Department of Nutritional Education", chiefly by means of numerous publications, is particularly active and the Institute publishes a Review, "Baking Technology", which has a wide circulation. (*The American Food Journal*, vol. XXII, No. 3 ; March 1927).

Yearly Free Courses in Paris on Agricultural Credit Schemes and Cooperation. — The principal object of these courses is to facilitate the training and recruiting of directors and accountants for the various agricultural associations and especially for agricultural credit banks. These courses last three months, during one of which practical experience is provided in some institute of credit or agricultural cooperation. The address of the school is 5, rue Las-Cases, Paris.

The following subjects are included in the programme of study : co-operative agricultural credit and co-operation ; general book-keeping as applied to agricultural associations ; applied legislation, management and working of institutes of agricultural credit ; banking and stock-exchange operations ; financial questions and calculations of annuities ; commercial questions.

At the end of the term a certificate is given to all students who prove to have benefited by attendance at the lectures. (*La Vie agricole et rurale* ; t. XXXI, a. 16, n° 32 ; août 1927).

Courses on Tobacco Culture in Italy. — At the Verona Section of the Royal Experimental Institute for the cultivation of tobacco (Verona, Via Cappuccini Vecchi, 19) a course has been opened for giving theoretical and practical lessons to the sons of tobacco-growers and traders on "The direct fire curing of Kentucky tobacco".

The courses are taken in weekly relays by the pupils, who receive practical instruction on a specially cultivated plot and also attend daily lectures.

Agricultural and Animal Husbandry Research Organization in Japan. — Japan now possesses a considerable number of institutions adequately equipped for carrying out research work in agriculture and kindred industries. Each institute or experiment station constitutes, as far as regards methods and the nature of the research, a perfectly independent and complete

organization, possessing all those special sections of study which, by co-ordinated working, make it possible to treat thoroughly each particular problem. Moreover, quite independently of the purely National Research Institutes, some of the more important prefectures have similar special institutions for the study of local problems.

The following institutions are dependent on the Ministry of Agriculture and Forests. the Imperial Station of Agricultural Research at Nischigahara, Tokio; the Imperial Station of Horticultural Research at Okitsu, Shidzuoka; the Tea Research Station at Kanaya, Shidzuoka, the Sylvicultural Research Station at Shimo-Meguro, Tokio; the Research Station for Ornithology and Mammalogy at Renkoji, Tokio; the Imperial Silk Research Station at Nakano, Tokio; the Imperial Station for Research in Animal Husbandry at Miyako Mura, Chiba; the Veterinary Laboratory at Nischigahara, Tokio; the Imperial Institute of Fisheries at Yetchu Jima, Tokio.

Among other Institutes of interest to agriculture and directly dependent on the Ministry of Industry and Commerce may be mentioned: the Nitrogen Laboratory, at Nagameguro, Tokio; the Imperial Institute for Research on Combustibles, at Kawaguachi Machi, Prefecture of Saitama; the Imperial Geological Service, at Kyobashi-Ku, Tokio, and the Imperial Research Station for Silk Industries, at Hon-machi, Yokohama. There is also a Government Brewing Institute at Takinogawa, Tokio, under the Ministry of Finance. (*The Philippine Agriculturist*, Vol. XVI, No 1; June 1927).

AGRICULTURAL AND SCIENTIFIC INSTITUTIONS AND ASSOCIATIONS.

An Organization for the Export of Cereals from the States of South Eastern Europe. — The National Hungarian Agricultural Union is supporting the establishment of a common cereal export organization for Jugoslavia, Rumania and Hungary; such a body would have to determine the amounts to be exported by the three adherent States, and possibly also the prices of the products for export and would also be required to deal with the marketing of the excess production of these States. (*Wiener Landwirtschaftliche Zeitung*, 1927, Messennummer 37)

Agricultural Associations in the Republic of Salvador. — The President of the Republic, in order to promote agricultural progress, proposes to start the formation of agricultural associations. The Agricultural Society of the Department of St. Vincent has already been founded and Dr. GONZALO ANGULO has been elected President. (*Bulletin of the Pan-American Union*, August 1927).

CONGRESSES AND CONFERENCES.

International Emigration Conference. Havana, March 1928. — A section of the conference will be entrusted with the examination of the general report which the "International Committee for the Emigration and Immigration Conference" has been requested to present on the action taken by the

Governments and the International Organizations as a result of the resolutions of the Rome Conference, and on the steps to be taken regarding resolutions which have not yet been given effect.

Four further sections of the Conference will consider the following questions:— (1) Transport and Protection of Emigrants. — Hygiene and Sanitary Services; (2) Assistance of Emigrants. — Co-operation, Insurance and Mutual Credit; (3) Methods of adapting the volume of emigration to the needs of labour in the country to which directed. — Cooperation between the Emigration and Immigration Services of the different countries; (4) General principles of Immigration Treaties.

Colombian Coffee Planters' Congress. Medellin, Colombia, July 1927. — Programme of the Congress: The Protection of Colombian Coffee; Publicity for the Coffee Trade; Producers' Organizations; Statistics of Crops, Production, Exports and Consumption; Establishment of Markets; Creation of Rural Credit; Standardization of Coffee Qualities; Studies on Coffee Diseases; Scientific Methods of Cultivation and the Foundation of Agricultural Co-operative Associations.

1st Congress on Milk and Milk Products. Havana, Cuba, April 1927. — More than 350 delegates, representing about 14,000 producers, took part in this Congress which opened on 18 April last. In all 48 resolutions were adopted, of which some were extremely important and contemplated the intervention of the Government and the Legislative Assembly for the establishment of Agricultural Banks to assist the Milk Industry; and also for making the tuberculin test compulsory for all milch cows and the establishment of stations for the pasteurization of milk for human consumption.

XVth Congress on Agricultural Mutual Credit and Cooperation. Metz, France, 30 June-3 July 1927. — Various questions were discussed concerning the working of the "Caisses de Crédit Agricole" as regards an extension of their methods of dealing with district banks to deposits on current account on behalf of any individual depositor, etc. The Congress expressed itself in favour of the creation of associations for breeding cattle and sheep and their grouping in federations, of milk control, of the promotion of competitions for pure bred cattle, and of increasing the premiums offered for the preservation of pure breeds. Resolutions were adopted for presentation to the Government, requesting that a definite settlement should be made of the fiscal burdens affecting agricultural associations and cooperative societies, and for presentation to the Senate, asking that CHANAL's bill should receive consideration. Under the terms of this bill credit would be facilitated and the economic situation of medium and small rural estates would stand greatly to benefit. Various other questions were discussed, including the establishment of milk prices and the export of milk, rural housing, the spread of the cinematograph and of wireless in the country, the establishment of rural electricity associations, vocational instruction, the social education of the young peasant, insurance against accidents in agricultural work.

The XVIth National Congress will be held in 1928 at Arras.

Annual Wheat Trade Meetings, Lille, France. — The "Syndicat général du commerce des grains, graines, engrais et dérivés de Lille et la région du Nord" has been responsible for organizing meetings to be held on the first Monday in October every year. The first meeting took place on 3 October, 1927, under the patronage of the Lille Chamber of Commerce. The object of the meetings was to consider the trade questions which are intimately concerned with national grain production, especially as relating to Northern France.

IVth North African Conference, Algiers, May, 1927. — Among the questions discussed at this Conference was a suggestion that improved methods of shearing and sheep dipping should be adopted in all the sheep rearing districts of North Africa. It was also decided to develop wool grading schemes by helping to form wool co-operative societies and suitable markets at which the wool classification as used at the Tadmit breeding station would be adopted. Finally the conference decided to ask for the collaboration of Chambers of Commerce and to investigate the possibility of providing North Africa with a wool grading Chamber. (*Les Cahiers coloniaux de l'Institut Colonial de Marseille*, n. 446; 3 août 1927).

Agricultural Conference, Kenya, Nairobi, August 1926. — This South and East African combined Agricultural, Cotton, Entomological and Mycological Conference was convened by the Secretary of State for the Colonies. Its chief object was to provide an opportunity for co-workers on agricultural problems in Africa to meet and discuss their most urgent problems. Cotton questions naturally were much in evidence, the following being among those discussed: the technique of field experiments; the keeping and utilization of records; the position with regard to cross-breeding; the treatment of seed before sowing; mass methods for maintaining and improving the quality of cotton in the districts; interchange of strains between African countries; the introduction of new varieties from abroad; methods of testing improved strains; the cotton tax. The Empire Cotton Growing Corporation was asked to prepare, publish, and keep up-to-date a list of all varieties and strains of cotton in cultivation throughout the world, with a description of the characteristics of each variety, and the conditions of their growth. It was also thought that a uniformity of nomenclature of African strains was necessary and that particular local strains, showing specialized qualities, should be stored locally against possible need.

Meetings of the Fascist Agricultural Associations. Rome, 8-10 October 1927. — The following National Associations were represented: Agricultural Technicians; Labourers and Fixed-wage Earners; Small Cultivating Owners and Small Rent-paying Tenants; Share Tenants; Specialized Workmen and Agricultural Machine Workers; Woodmen and Forest Workers; Shepherds; Farm Administrative Employees.

The questions discussed included the following: The function of agricultural technicians and agricultural technology in relation to the development of the workers' associations; — Reform of agricultural instruction and protec-

tion of vocational titles; — Scientific management in agricultural work; — The contract of service for agricultural technicians; — The employment of labour in relation to land and agricultural improvement schemes; — Employment bureaux, internal transfer of labour, land settlement policy; — Produce sharing agreements; — Questions relating to stock and improvements; — Regulations for leasing (legal value of the collective agreement and general regulations); — Office for finance and financial aid; — Agricultural credit and improvements; — Contract of service for specialized workers and agricultural machine workers; — Courses of instruction and validity of the certificates for specialized workmen and agricultural machine workers; — The possibility of developing the use of agricultural machines on the small farm; — Contract of service for woodmen and forest workers; — Reafforestation work and workers; — Customs regulations regarding prepared timbers; — Contract of service for shepherds' assistants; — Leasing of grass lands and pastures; — Organization of the sale of the products of sheep farming; — Contract of service for farm administrative employees.

IXth Congress of Italian Beekeepers, Trento, 26-29 August 1927.

— At this Congress the following were the chief questions discussed: (1) The necessity that beekeepers should be able to obtain sugar free from all duties for winter feeding; (2) The influence of curative measures as applied to fruit producing plants in relation to beekeeping; (3) The control of "Isle of Wight disease" and remedial measures; (4) Control measures, both preventive and curative, adopted for the bee pest. Methods of disinfection; (5) Obligatory and voluntary measures against infectious ailments, theft, fire, etc; (6) The choice of the queen bee and establishment of experimental and fertilizing stations in connection with the various sections of the Italian Bee Keepers Association; (7) Exportation marks for queen bees.

1st National Congress regarding Accidents to Agricultural Workers. Vercelli, 24-26 September 1927. — This Congress took place under the auspices of the *Cassa Mutua Infortuni agricoli* at Vercelli, from which further information can be obtained.

EXHIBITIONS, FAIRS AND COMPETITIONS.

Vine Week at Tunis in April 1928. — Full information can be obtained from the head-quarters of the Committee at Tunis at the office of the *Direction Générale de l'Agriculture*.

IInd International Fair, Salonica, 18 September-3 October 1927. — This fair is organized each year by a special committee under the control of the Greek Ministry of National Economy and the Chambers of Industry and Commerce at Athens, Piraeus and Salonica.

Animal Husbandry Exhibition, Como, Italy, 5-6 September, 1927. — This exhibition was organized by the Agricultural Travelling Professorship and other rural bodies and prizes of the value of 20,000 Liras were offered.

Wool Industry Exhibition, Biella, Italy, September 1927. — This exhibition was held on the occasion of the First International Wool Congress.

Agricultural Exhibition, Turin, 1928. — This exhibition will consist of 18 different groups ; (1) Horticulture ; (2) Growing of cereals ; (3) Rice growing ; (4) Viticulture ; (5) Olive growing ; (6) Truffle, mushroom and edible fungus growing ; (7) Forests, parklands, cultivation of alplands ; (8) Phytopathology , (9) Drainage and land improvements , (10) Irrigation and agricultural hydraulics ; (11) Animal husbandry and cheese making ; (12) Beekeeping ; (13) Poultry keeping ; (14) National agricultural machinery ; (15) Shooting and fishing ; (16) Rural housing ; (17) Rural education ; (18) Agricultural bibliography.

Groups 1, 6, 7, 12 and 15 will be of an international character.

There will also be a special building connected with the exhibition dealing with the question of alimentation, in which special attention, will be given to the industries connected with food extracts and wine making. Further information can be obtained from the headquarters of the Committee: *via Carlo Alberto 23, Turin* (162).

NOTES ON THE INTERNATIONAL INSTITUTE OF AGRICULTURE

Nomination of Delegate. — Venezuela has nominated his Excellency **M. PARRA - PEREZ**, Minister at Rome, as delegate to the Permanent Committee in place of His Excellency **M. C. ZUMETA** nominated Minister at Paris.

Vth International Seed Testing Congress. — This Congress, as is generally known, will take place at the Institute in May 1928. The IInd International Seed Trade Congress will take place at the same time at Bologna, and the work of these two important congresses will be brought to a conclusion by a joint meeting at Rome.

Representation of the Institute at Conferences and Congresses. — The Institute was represented at the International Congress on Household Economy, which took place at Rome in November

International Agricultural Film Collection. -- As already announced to the readers of the *Review*, the Institute is proceeding to draw up its International Catalogue of films of a scientific and practical nature dealing with agriculture.

Imperial Agricultural Research Conference, London. — The Institute received an invitation from the Ministry of Agriculture and Fisheries in London to send a representative to the first Imperial Agricultural Research Conference which took place in October last, the proceedings continuing throughout the month.

The Institute was officially represented on the occasion by Mr. R. J. THOMPSON, Delegate of Great Britain, and an English member of the staff of the Secretariat also attended as an observer.

The work of the Conference was strictly limited to questions of agricultural research as affecting the agriculture of the British Empire, but occasion was found for bringing certain phases of the Institute's work of particular interest in this connection to the notice of the respective Commissions in the form of Memoranda. The Conference also expressed its appreciation of the value of the Institute's proposals for holding a World Agricultural Census in 1930 in accepting the report of the Commission of Agricultural Economics in

which it was recommended "that the attention of the Governments of the Empire should be drawn to the need of co-operating to the fullest possible extent in the project of the World Agricultural Census of 1930-31". Naturally too in the course of the less formal business of the Conference opportunities for reference to the activities of the Institute were forthcoming and there was clear evidence that the Institute's publications are carefully studied and found of value in different parts of the British Empire.

Among the representatives present were many persons well known to the Institute as Delegates to the General Assembly, Members of International Congresses and Conferences, either organized directly by the Institute or to which it has extended its hospitality, or again as members of one or other of the Commissions of the International Scientific Council. It may well be that in the future the work initiated at the Conference will, from the point of view of the Institute, make itself more particularly felt in the International Scientific Council, but in any case it is evident that all the elements of an effective liaison between this new British Imperial movement and the Institute are present and can be made available, should occasion demand. Moreover as the chief object of the Conference was the co-ordination of the research work and the completion of the necessary machinery for carrying it out effectively throughout the vast area covered by the British Empire, with all its various types of population, climate, cultivation, etc., the results that may be achieved cannot fail ultimately to be of international significance.

It is proposed next month to give further particulars regarding the organization and detailed work of the Conference, which, as will be recognized, from the point of view of science marks an important stage in the history of agricultural research and hence at the same time from the point of view of economics a distinct forward step in the direction of increased agricultural production.

Meetings of the International Scientific Agricultural Council and of the Permanent International Committee of Agricultural Associations. — These two gatherings which occupied a large part of November achieved a remarkable success. The December number of the Review will give a complete report of the two meetings.

Personnel of the Bureaux of the Institute. — The Permanent Committee has made a certain number of appointments to the places still vacant and for work on special subjects such as dairying statistics, rural economics, trade in agricultural products, general economic questions, the press and general technical questions. A further appointment will be made of an assistant to the chief of section who deals with plant diseases.

In accordance with the Resolution of the General Assembly the choice of this personnel has been made on strictly international lines. On 1 January 1928 the 1st grade personnel will be divided among the different nations as follows:—

Germany 5; Belgium 2; Chile, Spain, United States 1; France 6; Great Britain 8; Italy 20; Luxemburg 1; Norway 1; Holland 3; Rumania 1; Russia 2; Sweden 2; Switzerland 2; Czechoslovakia 1.

World Agricultural Census of 1930. — M Leon M Estabrook, Director of the World Agricultural Census Project, has informed the Institute that, on the occasion of his recent visit to the Commonwealth of Australia, that Government has confirmed its adhesion to the Census Programme of the Institute

By telegram from Wellington N. Z. Mr Estabrook states that the New Zealand Government also confirms its adhesion

The Portuguese colony Macao has communicated its adhesion to the Census scheme and has requested that further copies of the standard form prepared by the Institute shall be sent

Received by the Library

Ber.=Berlin, Cam.=Cambridge, Gen.=Genève, Lon.=London, Mad.=Madrid, Mil.=Milano
N.Y.=New York, Par.=Paris, Tor.=Torino, Wash.=Washington.

Acerbo, G. Studi corporativi. Firenze, R. Bemporad & figlio, [1927]. 124p., 24,5cm.

« Saggio bibliografico », p. [81]-124.

Acerbo, G. Studi riassuntivi di agricoltura antica. Serie prima. Roma, Sindacato nazionale dei tecnici agricoli fascisti, 1927. v. 1, pl., 31,5cm.

« Appendice bibliografica generale », p. [67] 69.

Belgique. ADMINISTRATION DE L'AGRICULTURE ET DE L'HORTICULTURE. Renseignements sur l'activité des associations d'intérêt agricole. Bruxelles, Heyvaert & Hermant, 1925. 16p. 26cm. (Publications du Service des associations et de la statistique, n° 50).

Brasca, L. Gli istituti di credito fondiario. 2a ed. riveduta. Torino, Unione tip. ed. torinese, 1926. 278p. tab., 25,5cm. (Rota, G. Biblioteca di ragioneria applicata, monografia 76^a).

British India. DEPARTMENT OF AGRICULTURE. Review of agricultural operations in India, 1925-26. Calcutta, Central publication branch, 1927. 152p., pl., tab., 25,5cm.

Brutskus, B. Agrarentwicklung und Agrarrevolution in Russland. Berlin, H. Sack, 1925. 249S., 24cm. (Osteuropa-Institut, Breslau. Quellen und Studien. Abteilung Wirtschaft. Neue Folge, Heft 2).

Cheema, G. S. The fig industry in Asia Minor: notes of a visit in 1925. Bombay, Govt. central press, 1927. 7p., pl., 25,5cm. (Bombay. Department of Agriculture, Bulletin 131, 1926).

Conferencia NACIONAL DE LEITE. Annaes da 1^a Conferencia nacional

de leite promovida pela Sociedade nacional de agricultura. Rio de Janeiro, 1925. Rio de Janeiro, Companhia nacional de artes graphicas, 1926. 354p., 27cm.

Congrès INTERNATIONAL COTONNIER. Official report of the 15th International cotton congress held in Egypt, 1927, by the International federation of master cotton spinners' & manufacturers' association. Manchester, Taylor Garnett Evans, 1927. 263p., ill., diagr., port., 25,5cm.

Ente AUTONOMO PER IL PROGRESSO TECNICO-ECONOMICO DELL'INDUSTRIA SOLIFERA. L'industria mineraria solifera siciliana. Torino, Tip. sociale torinese, 1925. 467p., ill., port. tab., diagr., 28cm.

Heyne, K. De nuttige Planten van Nederlandsch Indië. [Batavia, Ruysgrok, 1927]. 3v., tab., 27cm.

« Les plantes utiles des Indes Néerlandaises »

Hunziker, O. F. The butter industry prepared for factory, school and laboratory. I. a Grange, Ill., Author, 1927. 682p., ill., tab., 23,5cm.

Hunziker, O. F. Condensed milk and milk powder prepared for factory, school and laboratory. I. a Grange, Ill., Author, 1926. 668p., ill., tab., 23,5cm.

Institut NATIONAL AGRONOMIQUE, PARIS. ASSOCIATION AMICALE DES ANCIENS ÉLÈVES. Annuaire 1927. Paris, N. Renault et cie., 1927. 320p., ill., 24,5cm.

Italia. LEGGI, CODICI, ecc. L'organizzazione sindacale italiana. Mi-

lano, « *Giurisprudenza del lavoro* », [1927]. 451p., 21,5cm.

« Appendice alla III^a ed. della *Disciplina giuridica dei rapporti collettivi del lavoro* ».

Latvijas KOOPERATĪVU KONGRESU PADOME. Latvijas kooperācijas gada gramata 4 & 5 gads. Rīga Latvijas kooperatīvu kongresu padomes izdevums, 1926-1927. 2v., 22,5cm.

« Conseil des congrès coopératifs de la Latvie. Annuaire de la coopération en Latvie, 4^{ème} et 5^{ème} année ».

Maslov, S. Princip soukromého vlastnictví v pozemkových reformách poválečné Evropy. Praha, Státní pozemkový úřad, 1927. [45]p., 19cm.

Le principe de la propriété privée dans la réforme foncière en Europe.

Nederlandsch Indië. DEPARTEMENT VAN LANDBOUW, NIJVERHEID EN HANDEL. Jaarboek. 1926. Weltevreden, Landsdrukkerij, 1927. 237p., 24cm.

Annuaire du Département de l'agriculture, de l'industrie et du commerce.

Reichsverband DER DEUTSCHEN LANDWIRTSCHAFTLICHEN GENOSSENSCHAFTEN, BERLIN. Bericht über die Verhandlungen des 40. Deutschen landwirtschaftlichen Genossenschaftstags zu Kassel am 23. und 24. Juni 1927. [S. l., 1927.] 73S., 31,5cm.

Snyder, C. Business cycles and business measurements. New York, Macmillan, 1927. 326p., tab., diagr. 23cm.

Студенский, Г. Сельское хозяйство СССР в перспективе пятилетнего

развития. Москва, Новая Аеревня, 1927. 29p., 26,5cm.

The Russian agriculture in the perspective of 5 years development.

Verband OSTSCHWEIZERISCHER BRAUNVIEHZUCHT-GENOSSENSCHAFTEN. 15. Bericht, Geschäftsjahr 1926. [S. l., Flawil, 1927. 29S., 25,5cm.

Nouveaux périodiques.

British India. CENTRAL BUREAU OF ANIMAL HUSBANDRY AND DAIRY IN INDIA. Journal, v. 1, part I-II. July-April, 1927. Calcutta, Central publication branch, 1927. 103p., pl., 24,5cm. Subscription: Rs.2-8 per annum.

Paged continuously.

« A quarterly dealing with cattle breeding, dairying, cultivation and storage of fodder crops, animal nutrition and other aspects of animal husbandry ».

Italia ISTITUTO CENTRALE DI STATISTICA. Bollettino quindicinale dei prezzi. Anno 1^o, fasc. 1^o, 22 luglio, 1927. 15p., 31cm. Abbonamento annuo: Amministr.az. pubbliche, Lit. 24; Italia e colonie Lit. 36, estero Lit. 50.

« Supplemento ordinario alla Gazzetta ufficiale del Regno d'Italia ».

Zemедельскі PREHLED. Ročník II. 1, 15. ledna, 1927. 50 + 12p., 24,5cm. mens., excepté en juillet et août. Abonnement par an: Tchecoslovaquie Kč 45; étranger Kč 60.

Deuxième titre en français: « Revue agricole ».

Publié par le Ministère de l'agriculture. Contient aussi, comme supplément, le Bulletin de ce Ministère.

Direttore responsabile: Prof. CARLO DRAGONI.

Roma — L'Universale; Tipografia Poliglotta (C. C. I. di Roma, n° 18891)

ECONOMIC AND SOCIAL QUESTIONS

CO-OPERATION AND ASSOCIATION

Co-operative Cotton Marketing in the United States.

GATLIN, George O Co-operative Marketing of Cotton United States Department of Agriculture Department Bulletin No 1392 Washington, D C, January 1926 — SWARTHOUT, A V The Staple Cotton Co-operative Association, United States Department of Agriculture Department Circular No 397 Washington, D C, August 1926 — JONES, J W, and JESNESS, O B Membership Relations of Co-operative Associations (Cotton and Tobacco) United States Department of Agriculture: Department Circular 407 Washington, D C, January 1927 — PETROW, W W Some Economic Conditions that Hinder Co-operative Cotton Marketing *Co-operative Marketing Journal*, Vol I, No 4 Washington, D C, March 1927

Since the year 1920 a rapid development has taken place in the co-operative marketing of cotton in the United States With few exceptions, the societies which engage in this branch of co-operation are of the "single-commodity" type, formed exclusively for the purpose They are nearly all State-wide, embracing, that is, a whole State All insist upon the members signing a marketing contract by which they bind themselves for a specified period of years to deliver all their cotton to the association.

The United States Department of Agriculture has made special studies of these associations and valuable information is available regarding their organisation and working which throws considerable light on the problems of co-operative marketing

The initiative in the formation of the societies has been taken by different bodies, but the general plan of organization has almost always been the same. At a meeting of cotton-growers an organization committee is appointed. The committee draws up an association agreement and a marketing agreement and proceeds to conduct an intensive campaign amongst the cotton-growers of the State or region to obtain signatures to the agreements.

The association agreement indicates the purposes of the proposed association and the conditions of membership. The marketing agreement

is an undertaking, on the part of the person signing it, to deliver to the association all the cotton produced or acquired by him during the years specified therein. Both the association agreement and the marketing agreement are only binding in the event that before a specified date they have been signed by cotton growers whose aggregate production, calculated on the basis of the production in a specified year or series of years, reaches a certain minimum number of bales. In two cases a minimum number of acres cultivated was fixed instead of a minimum number of bales produced. In the formation of one association, the Texas Farm Bureau Cotton Association, it was decided that the agreements should be binding if the number of bales under contract reached 1,000,000, but that, if this figure were not reached, the cotton growers who had signed the agreements should have the right to withdraw. If after the right of withdrawal had been exercised there remained 500,000 bales under contract, the association was still to be formed. In the organization of the Georgia Cotton Growers' Co-operative Association a minimum of 300,000 bales was first fixed, but the results of the membership campaign were disappointing; a new organization committee was formed, the minimum was reduced to 200,000 bales and a fresh campaign was started which was completely successful. The Illinois Cotton Growers' Co-operative Association, a small society, was formed with 800 acres under contract, though a minimum of 1,500 acres had previously been fixed.

The table on page 309 contains a list of the principal co-operative cotton marketing associations in the order of their incorporation and indicates the minimum number of bales or acres fixed, the number of bales under contract at the close of the membership campaign, the number of members at the date of incorporation, and the number of members in May 1925.

The associations are incorporated as non-stock, non-profit co-operative associations under the laws of the various States. The board of directors is for the most part elected by the members, each member having only one vote. The area of operations of the association is divided into voting districts, the members in each district electing one or more directors. In some societies there are on the board of directors, besides the representatives of the districts, directors elected by the general body of members, and almost all of the associations make provision for the nomination by the Governor of the State, the President of the State Agricultural College or other official, or by some public body, of one or more directors to look after the interests of the general public.

All the associations figuring in the table, with the exception of the Staple Cotton Co-operative Association and the Arkansas Farmers' Union Cotton Growers' Association are members of the American Cotton Growers' Exchange which was formed in 1921. The sales of cotton are not completely centralised in the Exchange, though the desirability of this has frequently been discussed. As a rule, each member association has its own sales department, and itself sells the greater part of the cotton delivered to it by its grower members. The Exchange, when requested, sells cotton on account of the member associations. In particular it handles a large part of the export sales, maintaining for the purpose selling

The Principal Co-operative Cotton-marketing Associations : Date of Incorporation, Bales or Acres under Contract, and Number of Members.

NAME OF ASSOCIATION	Date of Incorporation	Minimum number of bales or acres fixed	Number of bales or acres under contract at close of membership campaign	Number of members at date of incorporation	Number of members in May 1923
Oklahoma Cotton Growers' Association	26 April 1921	300,000 bales	400,000 bales	35,000	55,041
Staple Cotton Co-operative Association.	23 May 1921	200,000 bales	216,000 bales	1,800	2,514
Arizona Pima Cotton Growers	13 July 1921	26,345 acres	27,153 acres	713	928
Texas Farm Bureau Cotton Association	27 July 1921	1,000,000 bales (or 500,000 after exercise of right of withdrawal)	600,000 bales	19,146	49,426
Arkansas Farmers' Union Cotton Growers' Association	31 October 1921	40,000 bales	20,000 bales (after exercise of right of withdrawal)	3,500	4,000
North Carolina Cotton Growers' Co-operative Association	8 February 1922	200,000 bales	340,000 bales	26,000	38,052
Arkansas Cotton Growers' Co-operative Association.	25 February 1922	200,000 bales	211,000 bales	5,500	14,569
South Carolina Cotton Growers' Co-operative Association.	16 June 1922	400,000 bales	415,871 bales	9,981	14,912
Georgia Cotton Growers' Co-operative Association.	27 June 1922	300,000 bales (reduced to 200,000)	240,000 bales	12,500	43,198
Alabama Farm Bureau Cotton Association	1 July 1922	100,000 bales	169,000 bales	11,350	25,148
Louisiana Farm Bureau Cotton Growers' Co-operative Association.	24 February 1923	75,000 bales	83,500 bales	5,230	6,253
Mississippi Farm Bureau Cotton Association	30 March 1923	100,000 bales	108,639 bales	11,773	21,224
Tennessee Cotton Growers' Association	4 June 1923	60,000 bales	70,000 bales	6,000	8,785
Missouri Cotton Growers' Co-operative Association.	11 July 1923	10,000 bales	12,121 bales	470	796
Illinois Cotton Growers' Co-operative Association	8 October 1924	1,500 acres	800 acres	21	21

offices in England, France, Germany, Spain and Japan. It has sold for the associations about one-fourth of the cotton delivered and of this quantity about half has been exported.

Three of the smaller associations, the Tennessee Cotton Growers' Association, the Missouri Cotton Growers Co-operative Association, and the Illinois Cotton Growers' Co-operative Association, when formed, entered into an arrangement whereby the cotton delivered to them was to be sold, on a cost basis, by the Arkansas Cotton Growers' Co-operative Association. The Tennessee Association has since withdrawn from this arrangement and now uses exclusively the sales service of the American Cotton Growers' Exchange.

The characteristic method of selling the cotton is by "pooling" it according to grade and staple. That is to say the cotton of a particular grade and staple is mingled and the receipts from the sale of it are divided amongst the members delivering it in proportion to the quantity supplied. The number of separate "pools" which any one association may have varies from season to season and, owing to the number of possible combinations of grade and staple, it is often very large. One association had 86 pools in the 1921-22 season, 56 in 1922-23, 76 in 1923-24 and 120 in 1924-25.

The practice hitherto usually adopted of "pooling" separately the cotton of each combination of grade and staple, equalises the price received by all the growers who have delivered cotton of that particular class. It may, however, happen that, owing to market conditions, the cotton of a higher class is sold to less advantage than cotton of a lower class. When this occurs, the growers who have supplied cotton of the higher class receive a lower average price than those who have supplied cotton of the lower class. In order to distribute amongst the whole of the members the advantages obtained through favourable market conditions in the sale of some classes and the disadvantages resulting from unfavourable market conditions in the sale of other classes, it has been suggested that, instead of "pooling" each class of cotton separately, the receipts from the sale of all the cotton should be divided amongst the members in accordance with an established scale of relative values for the different classes of cotton. A plan of this kind has already been adopted by one large association and its working is being watched with interest by other associations.

The usual practice of the associations is to pay to members on delivery about 60 per cent of the value of an equal quantity of unclassified cotton. The subsequent payments are so adjusted as to take account of the grade and staple. As a rule further instalments of the price realised are paid in December and February, and the final payment is made between April and July.

The Staple Cotton Co-operative Association, in regard to which full information is available, under its original contract gave the member the option of receiving an advance of approximately 60 per cent. of the loan value of his cotton at the time of delivery, upon which he paid interest to the association, or of receiving his money only as sales of cotton were made,

in which case he would have no interest to pay. The Association makes monthly distributions to the members.

As it was felt that neither of the two options allowed by the original contract met the needs of all the growers a new contract was drawn up and presented to the members early in 1925. It was signed by more than two-thirds of the members and became effective in July 1925. Under this contract two additional methods of handling the members' cotton are provided. The grower is allowed, if he so chooses, to designate the day on which to fix the price of his cotton, and he is at once paid, as the base price, the New York future market price of that date. The cotton on which the base price is thus fixed is mingled with other cotton of the same grade and staple and is marketed in the usual way. In addition to the base price, the grower receives the balance of the average price received for cotton of the same class, as determined when the pool is closed. The future market is used to "hedge" the advance made to the member. Under this option about 80 per cent. of the full value of the cotton can be advanced to the grower, but the method involves certain extra costs which the grower who selects it must pay.

The fourth option gives the member the right to have his cotton sold separately and to say how and when it shall be sold. The object of this option seems to be to give members who are in need of money immediately after the crop is gathered the possibility of having their cotton marketed at once and promptly obtaining the full price for it. Advantage of the option seems also to be taken, however, by growers who imagine that they can pick the top of the market and thus obtain a price somewhat above the average. In the 1925-26 season about 27 per cent. of the cotton delivered to the Staple Cotton Co-operative Association was placed under the fourth option and though the bulk of this cotton was sold during the early part of the season, 23 per cent. of it remained unsold at the end of February. While the method may be necessary in the interests of certain members, steps should be taken to prevent it from being abused. In so far as cotton is sold under the fourth option, many of the advantages of co-operative marketing are lost.

The founders of some of the associations imagined that they would be able to secure control of such large quantities of cotton as to be able appreciably to influence the price. It is not difficult to prove, however, that this is virtually impossible, prices being dependent upon the world production and carry-over and not merely on production and carry-over in the United States.

The associations are able, however, to practice what is known as "orderly marketing", and thereby reduce the fluctuations in price. By "orderly marketing" is not to be understood the even distribution of the sales over the whole season. The consumptive demand varies at different times of the year and the associations endeavour so to distribute their sales as to keep it satisfied. Cotton-farmers, when marketing their crop individually usually sell the bulk of it in the first three or four months after the harvest. It has been thought that this "dumping" of the crop on the market has a serious effect in depressing prices, but it would seem that this effect had

been exaggerated, since even the co-operative marketing associations find it advisable to sell a large proportion of the cotton delivered to them within the first few months after the crop is gathered. American mills do their heaviest buying from September to January. Many of them purchase half their supply in these months and some of them their entire supply. The associations must, of course, adapt their sales to this demand.

When making its study of the working of the Staple Cotton Co-operative Association, the Department of Agriculture examined the month-to-month changes of cotton prices for the 25 seasons 1900-01 to 1925-26 and found that the average prices for September and October were lower than the average prices for either August or November or, in fact, any other month. October is, on the average, the month of largest marketings, but the marketings are only slightly larger than in November, whereas September marketings are much smaller than those of October or November. Yet the November price is the highest of any of the three months, so that it would seem that the volume of marketing has little effect on the monthly price. An important factor in determining cotton prices during the autumn months is the monthly forecast of cotton production published by the Department of Agriculture. When this report indicates an increase in production prices usually decline, when it indicates a decrease, they tend to rise.

The study further revealed a change in the trend of the average monthly prices since 1915. Instead of a decline for September and October there has been since 1915 a steady monthly rise from August through November. This change was not, apparently, due to the abnormal conditions of the war period, since the same steady rise has continued since the end of the war. The Department of Agriculture offers no explanation of the change in trend, but we suggest that it may, perhaps, be due in part to the perfection of the Federal Reserve System, which tends to stabilise prices by its now greater credit facilities for carry-over and possibly also by its monetary policy.

If it were possible accurately to forecast the seasonal variations of price the associations would be able to take more advantage of them in fixing their selling programmes. Besides the seasonal variations there are short-time fluctuations, depending probably on the way in which the trade in general views the outlook for the future. Of these short-time movements it is possible to take advantage, since the strongest demand usually comes during periods of rising prices and manufacturers and dealers generally do not want to buy when the price is falling. The Staple Cotton Co-operative Association, for example, adopts a policy of price stabilisation increasing its sales volume when prices are rising and reducing them when prices are falling.

Though the associations cannot handle a sufficient quantity of cotton to control the price, they have the great advantage of being able to sell cotton in what are known as "even-running lots", that is in lots of the same grade and staple. By doing so, they can obtain better prices than buyers are prepared to give for miscellaneous lots. That the manufacturers appreciate the service rendered by the associations in classing cotton is illustrated by

the experience of the Staple Cotton Co-operative Association, which has steadily increased the proportion of cotton sold by it directly to mills. In the 1921-22 season the proportion so sold was 53.0 per cent ; in 1922-23 it was 81.4 per cent ; in 1923-24, 89.8 per cent. and in 1924-25, 91.9 per cent.

Cotton is not usually sold for immediate delivery. It is sold for delivery at a future date. The sale price may be fixed at the time the sale is made or it may be left to be fixed on some future day. In the latter case the sale is said to be a sale on " call ". The terms of sale specify whether the buyer or the seller is to have the right of choosing the date on which the price is to be determined. In doing this the quotation in some specified future market for a future month, agreed upon at the time of the sale, is taken as a basis, the price being a specified number of " points ", that is hundredths of a cent, " on " or " off " the quotation made on the day on which the option is exercised.

Some co-operative societies have been unwilling to sell cotton on buyer's call, but this attitude may be a mistaken one, as it is necessary to meet, as far as possible, the desires of customers. The Staple Cotton Co-operative Association has sold freely on buyer's call, and an analysis of the sales on call shows that, if anything, the sales on buyer's call have been slightly more advantageous to the Association than sales on seller's call. The explanation seems to be that most of the spinner's sales tend to be made on a rising market, because as a general rule his customers are reluctant to buy on a falling market. When his goods are sold, probably the first concern of the spinner is to fix the price of the cotton to be used in manufacturing the stock with which to fill the order. The price of cotton sold on buyer's call tends, therefore, to be fixed when prices are rising.

We have seen that each member of a cotton-marketing association signs a marketing agreement by which he binds himself to deliver to the association all the cotton produced or acquired by him during a specified period. The marketing agreement of the Staple Cotton Co-operative Association, which may be taken as typical, lays down that if the grower fails to sell and deliver all of his cotton to the Association, he shall pay to the Association for all cotton marketed by him otherwise than in accordance with the terms of the agreement the sum of five cents per pound as liquidated damages for the breach of his contract. The agreement further gives the Association the right to obtain an injunction to prevent breach of the contract or a decree for the specific performance of it.

The marketing agreements of the associations have been tested in the courts of various States and have been proved to be legally valid. It must not, however, be imagined that they have proved effective in compelling all the members to deliver their cotton to the associations. The associations have found that the contract does not ensure delivery by all the members and that they are, generally speaking, unable to enforce it. Two associations, with membership contracts covering more than 300 000 bales received in their first year of operation 91,239 and 135,912 bales respectively. Of 1,832 growers who signed the marketing agreement of the Staple Cotton Co-operative Association before the end of 1921-22, 14 per cent. never delivered cotton, 19 per cent. delivered only during the 1921-22 season, 2 per

cent. delivered in some one year other than 1921-22, 17 per cent. delivered two years, 11 per cent. delivered three years, and 37 per cent. delivered in each of the four years 1921-22 to 1924-25. The same association had the experience that of the total number of members who had signed the contract the percentage who delivered cotton steadily declined from 82.3 per cent in 1921-22 to 72.4 per cent. in 1922-23, 55.4 per cent. in 1923-24 and 36.3 per cent. in 1924-25. When, however, the members are divided into groups according to the number of bales they deliver, it is found that the percentage of members delivering only one year tends to decrease as the size of delivery per member increases. Over 82 per cent. of the members delivering only one year fall into groups delivering 100 bales or less. The whole number of those who dropped out after one year's delivery formed about 22 per cent. of all active members, but they furnished only about 15 per cent. of the cotton.

If the experience of the Staple Cotton Co-operative Association may be taken as representing the general experience, it is clear that the smaller growers have greater difficulty in keeping their contracts, or are less disposed to do so, than the larger growers.

In part this seems to be due to the financial needs of the smaller growers, who may often find themselves in such a position that they must realize at once the whole price of their cotton and cannot be content with the advance made by the association. This difficulty arises all the more frequently since cotton is often the only crop grown and the proceeds of its sale represents the great bulk of the farmers' income. The production, too, is often based on credit and loans are repayable when the crop is gathered. Frequently, again, the crop itself is pledged and the grower is not completely at liberty to market it as he pleases.

Another reason why growers often are in need of money after the crop is gathered is that tenancies are usually only for one year and many tenants move to other farms. The extent to which the farm population is a shifting one may be gathered from the fact that in Oklahoma 59 per cent. of the farms are operated by tenants and in 1924 half of the tenant-farmers moved to other farms. The farmers who are owners are relatively much more stable; only 8 per cent. of all farmer-owners in Oklahoma moved in 1925. Even so, every third farm in Oklahoma had a new operator in 1924. Now when a farmer moves to a new trading centre, he must, before leaving, liquidate his debt to the local bank, and it may well be that 60 per cent. of the sale price of his cotton is not sufficient to enable him to do this.

Another cause of non-delivery may be found in the common practice whereby landlord and tenant take their share out of each bale of cotton. If the tenant wants to deliver his cotton to the association and the landlord is not willing, the tenant must buy out the landlord's share. Usually he is unable to do so and in such cases the landlord may refuse to allow the cotton to be delivered to the association, thereby compelling the tenant to violate his contract. Many landlords, indeed, go so far as to refuse to rent to a tenant who is a member of an association.

Some cotton marketing associations have endeavoured to remove the principal cause of non-delivery by providing credit facilities for the

grower. Thus the Staple Cotton Co-operative Association formed in 1923 the Staple Cotton Discount Corporation, from which the grower-member is able to obtain loans on favourable conditions. The officers of the Discount Corporation are officers of the Co-operative Association and all clerical and other work is performed by employees of the association without cost to the corporation. In 1925 agricultural credit corporations had been organized by eight associations and were being organised by three others.

The marketing associations themselves have need of large sums to finance the handling of the cotton. There is no share capital and the sums required are obtained for the most part on the security of the warehouse receipts for the cotton delivered to the association and stored pending sale or consignment to purchasers. Prior to the beginning of the season, the management of a marketing association estimates its credit needs and obtains credit usually from large banks in the Eastern States, from the larger city banks in the Southern States, or from the intermediate credit banks. The group of lending banks usually appoint a local bank to receive and hold the security and to pay the money to the association.

In the beginning, before the associations had established their reputation, difficulty was experienced in obtaining credit from bankers. At the opportune moment the War Finance Corporation, which had been revived in January 1921 for the purpose of aiding in financing the exportation of agricultural and other commodities, intervened and provided the necessary credit. In July 1921 it granted credit to the extent of \$5,000,000 dollars to the Staple Cotton Co-operative Association, and extended credit afterwards to the Oklahoma, Arizona, and Texas Associations. The total commitment to the four associations involved approximately \$50,000,000. Very little of this amount was used, but the fact that the War Finance Corporation had given credit to the associations induced private banking firms to supply funds on more favourable terms. At the beginning of the 1924-25 season a Committee of the American Cotton Growers' Exchange was able to arrange for credit to the amount of \$100,000,000 for its member organizations at interest rates varying between 4 and 4 ½ per cent.

The associations sometimes also obtain loans from members, particularly in the early part of the season, when few warehouse receipts have accumulated. At one time the South Carolina Association borrowed over \$1,125,000 from its members. Under similar circumstances the associations make use of their reserves in financing their operations. The reserves are built up by a deduction, authorised by the marketing agreement, of a certain percentage of the gross proceeds from sales of cotton each season. The maximum amounts authorised range from 1 per cent to 5 per cent. in the different associations, the usual limit being 2 per cent. In most of the associations a deduction of 1 per cent. has in practice been made. These deductions form what is known as the advance fund. Two associations, the North Carolina and Mississippi Delta Associations, issue interest-bearing certificates to members for the amounts deducted. The others do not issue certificates, but a few pay interest at the end of each year at the rate of 6 per cent. per annum.

The advance-fund remains the property of the association and its

use is controlled by the directors. In the event of its being distributed, the members share in it in proportion to the amounts deducted from their accounts, but the directors decide upon the time and conditions of distribution. In its new marketing agreement, the Staple Cotton Co-operative Association provided for the immediate distribution of the advance-fund accumulated during its first two years, and arranged that, in future, the advance fund should be repaid to the growers a year after the date of the issue of the certificate. The effect of this provision is to make the advance fund a revolving fund, the amounts deducted remaining at the disposal of the association only for one year.

The success of co-operative marketing associations depends largely upon the loyalty of the members and all of the cotton associations have found it necessary to conduct educational work amongst the members. The organisation of this work, which is known as "field service", varies considerably in the different associations. An attempt is being made, however, to bring about uniformity, through the general adoption of a plan presented and approved at a field service conference held at Memphis, Tennessee, in December 1924. This plan provides for a director of field service in each organization and for permanent district supervisors to be located in definite districts, each supervisor covering an area containing approximately 2,000 members. Under the district supervisors are local representatives, who are paid for temporary work, especially during the delivery season, in soliciting members and expediting deliveries. The plan also contemplates the grouping of members and the selection of group leaders, one such leader for each 10 members. Immediately responsible to the field-service director is a director of publicity, who edits periodicals sent to members of the staff and to field workers and prepares booklets, newspaper and magazine articles, etc. The plan also provides for the employment, where conditions warrant, of a special representative to keep in touch with bankers and business men with a view to furthering the interests of the association. A special department is also provided to give direct encouragement and assistance in the organization of rural communities. The plan outlined above has been adopted by the different associations to a greater or lesser extent; on the whole, however, the general adoption of the plan seems to be only a matter of time and much of the present weakness of certain associations will then in all probability be eliminated.

ECONOMIC AND SOCIAL CONDITIONS OF THE AGRICULTURAL CLASSES

Emigration and Labour in the Dutch East Indies.

FOCK, Dr. Dirk (State Governor General, Dutch East Indies) : The Labour Problem in the Dutch East Indian Archipelago *The Asiatic Review*, Vol. XXIII, No. 76 London, April 1927

In the Dutch East Indies a striking contrast exists between the economic condition of a number of the islands which although of immense natural fertility remain undeveloped, owing to lack of population, and in a state of economic stagnation, and the extraordinary pressure of population and high level of intensive cultivation found in Java. The time is in fact rapidly approaching when emigration on an extensive scale from Java will be unavoidable. At first sight it would seem a simple matter to bring about the transfer of the surplus Javanese population and their establishment as settlers in the neighbouring islands. There are however certain difficulties, which may be illustrated by reference to the position in Sumatra.

Sumatra, an island of which the area is nearly four-fifths of that of France, is, as are also the large islands of Borneo and Celebes, very sparsely populated, and Javanese emigration into Sumatra takes two forms : the recruiting of Javanese labour for work on the tobacco plantations of the north east coast, and assisted Government colonisation, by Javanese settlers, of the southern part of Sumatra.

Owing to the sparseness of native population, the planters who towards the end of last century, introduced cultivation of tobacco in the fertile valleys of N. E. Sumatra were obliged to import Chinese and then Javanese labour. The skill of the Javanese cultivators made them a most valuable asset, and as the employers paid the cost of the journey to Sumatra, and advanced some part of the wages, it was natural that all means should be used to prevent the workers quitting service, once established on the plantations. The existing system is that a contract is entered on for a period of five years, with possible renewal for another three years. On the one hand the employer undertakes certain obligations in respect of payment of wages, housing and medical attendance, and on the other, employees refusing to work or quitting service on insufficient grounds are liable to penalties. This "penal sanction" has been the subject of much criticism both in the Dutch Parliament and in the "Volksraad", or representative body of the Dutch East Indies, but it may be urged that the opening up and bringing under cultivation of unpopulated regions

would be impossible without the help of a coercive measure which compels workers to carry out obligations which they have incurred voluntarily and under a proper guarantee. The workers' rights are safeguarded by a Labour Inspection Service of many years' standing, which supervises the treatment of the employees on all the large estates. If there is found to be any failure on the part of the employer to carry out his obligations, and if abandonment of service by the worker, when it occurs, is found to be the result of such failure or of actual ill-treatment, the penal clause is inoperative. Generally speaking good conditions prevail on the plantations.

In a few cases provision has been made for the education of the workers' children. Javanese teachers have been engaged, and the school work includes simple practical instruction in agriculture, by means of school gardens. This points to a recognition on the part of at least some employers that the true solution of the problem lies in the settlement of families in the new surroundings. The Javanese have a deep attachment to their native island, and, in spite of the increasing struggle for existence there, tend to return thither on the termination of their contracts. If on the other hand opportunities exist for the acquisition of small holdings on the expiry of his contract, the Javanese worker is usually content to settle down permanently, and if such small holdings are in the immediate vicinity of the plantations, he may be able to give part of his time as a free worker to the planter, who thereby benefits by his experience. It is of interest to note that a system of this kind has been adopted in Surinam, or Dutch Guiana, where the Government gives special facilities for the acquirement of small holdings by Javanese emigrants who have come out under contract to work on plantations in the colony. Here the chief obstacle to complete success is the great distance separating Surinam from Java, but as between adjacent islands the difficulties should be much less and labour recruitment should form, as it were, a stage on the way to true colonisation. The penal sanction would thus naturally become superfluous and would disappear.

The main difficulty is, of course, the shortage of land available for the purpose of small holdings where it has been already, as on the east coast of Sumatra, taken up for large estates. Only the goodwill of the planters themselves, whether individuals or companies, can overcome this obstacle. On the other hand in the southern part of Sumatra, which is also the nearest to Java, land is easily acquired. The Government has brought over a number of families from Java, Javanese villages have been built and the Government makes advances to emigrants to defray the preliminary expenses of settling and planting the ground. Where necessary the Government also makes itself responsible for irrigation works. Much of the land has been brought under rice, the live stock is increasing, and there is a general appearance of prosperity. Contact with Java is maintained and in the harvest season relatives and friends come over to help with the work, and in this way the advantages of emigration become generally diffused. It is on these lines that the solution of the problem is to be found.

MARKETING OF AGRICULTURAL PRODUCE

Recent Marketing Legislation and the Activities of Cotton-Growers in Queensland.

Act to Consolidate and Amend "The Primary Products Pools Acts, 1922 to 1925", and "The Primary Producers' Organisation Acts, 1922 to 1925". *Queensland Government Gazette*, No 158, 25 November 1926. — *Queensland Agricultural Journal*, Vol XXVIII, Part 4 Brisbane, 1 September 1927. — *Oklahoma Cotton Grower*, Vol VII, No. 18, Oklahoma City, 25 September 1927. — *Empire Cotton Growing Review*, Vol. IV, No. 3, London, July 1927.

Organization of marketing of agricultural products in Queensland has now a history of steady progress extending over the last five years(1), and the legislation fostering this organisation has been recently consolidated by an Act passed on 20 November 1926 in the Queensland Parliament. Under this Act a Board, with marketing powers if so desired by the growers may be constituted by an Order in Council on the petition of 50 growers, of any "grain, cereal, fruit, vegetable or other product of the soil of Queensland, or any dairy produce, or eggs, or any article of commerce prepared other than by the process of manufacture from the produce of agricultural or other rural occupation in Queensland". The actual constitution must be preceded by due notice of the intention, and if fifty growers demand a poll then a vote of the growers of the commodity in the area to which the Order is intended to apply must first be taken. If less than two thirds of the votes polled are in favour, the proposed Board cannot be constituted. If, however, two thirds or more are in favour, or if no poll is called for, the Board is duly appointed, and consists of the prescribed number of elected representatives of the growers of the commodity, with the addition, in the case of a Board with marketing powers, of the Director of Marketing.

Powers of employment of agents, arranging of financial accommodation, and of sales on home and overseas markets are as usual included under marketing powers.

The organisation of agriculture is as before completed by a Council of Agriculture, consisting of members elected from amongst members of Boards, and by a nexus of Local Producers' Associations.

(1) See: *International Review of Agricultural Economics*, April-June 1925, pp. 241-242 and July-September 1926, pp. 415-419.

The outstanding feature of the new legislation, as compared with the Primary Products Pools Acts 1922-1923, is the power of vesting ownership of the commodity in the Board, if so requested by the terms of the original petition of the growers. Further provision may also be made "as will enable the Board effectively to obtain possession of the commodity" and so to deal with it "as may be deemed necessary or convenient in order to give full effect to the objects and purposes for which the Board is constituted".

These provisions are made applicable to Boards constituted under the earlier legislation, and a Board constituted without such powers may afterwards receive them by Order in Council, if desired by the growers.

In this connection the recent activities of the Queensland Cotton Board are of special interest. Cotton growing on Queensland virtually dates from 1922 although some small areas were previously planted. The cotton belt lies mainly behind the coastal ranges at elevations up to 1,000 feet above sea-level, and extends from the Darling Downs northwards towards Rockhampton, an area roughly 500 miles long and over 200 miles wide. No continuous cultivation however exists, and the groups of farms or plantations are often widely separated by stretches of open forest or scrub. Concerted action on the part of the growers at all stages of preparation for market is therefore the more desirable. In May of this year the Cotton Board adopted a resolution advising growers that it "is in favour of co-operative control of ginning and oil-milling activities, and is of opinion that the ownership of any such plant should be vested in the Cotton Board as the only constituted body representing the growers". The Board is now negotiating with private owners of ginneries and oil mills regarding terms of purchase and is making arrangements for the financing of purchases. It is also stated that the Board is considering possibilities of erecting cotton ginneries and oil mills.

A New Proposal for Cattle Farming in South Africa.

The Farmer's Gazette, Vol. V., No. 140 Pretoria, 20 July 1927, pp. 5 and 6. — *The Sun and Agricultural Journal of South Africa*, Johannesburg. April 1927, pp. 251-363. — Official Year Book of the Union of South Africa, No. 8, 1910-1925.

Among the problems of the cattle industry of South Africa is the existence of a large surplus of beef cattle beyond local needs, which is steadily increasing, while remaining of poor quality. The great majority of cattle in the Union consists of herds of indigenous cattle with a marked infusion of Afrikaner blood. In a country of which the total population is about 7,000,000 (*i. e.*, 1,672,106 Europeans as returned in 1926, and an estimated non-European population of about 4,500,000), there are now over 9,000,000 head of cattle, the distribution being most dense in the Eastern Transvaal, on the Orange Free State high *veld*, in Natal and on the eastern coast of Cape Province. An increasing attention is being paid to the im-

provement of beef breeds, and from the last two regions in particular a small export trade is being built up. In 1926, there was a total export of 15,184 tons of frozen beef, of which 7,215 tons were sent to Italy, 6,310 to France, and 1,302 to England. The total exports in 1924 had only amounted to 3,843 tons (1).

On the other hand, there are extensive areas in the Union, more particularly in the Northern and Western Transvaal, and also in Rhodesia, which are eminently suitable for ranching, while far from suitable for any other form of agriculture. Owing however, to the congestion of the Union markets, and the difficulties attending railway or other transport to the East Coast ports, this industry remains in a backward condition.

An interesting proposal has recently been put forward, the occasion being a meeting of the Economics Society of South Africa (Cape Town Branch) Dr. Eric Nobbs, a well known expert in South African agriculture, in a paper entitled the "Cattle Industry of South Africa" made the suggestion that advantage should be taken of the fine grass lands of the Bechuanaland Protectorate lying to the west of the Transvaal to move away, regularly and gradually, young oxen from the ranching lands of the Transvaal and Rhodesia, to this "sweet veld" pasture which has the peculiarity of curing on the stalk and hence affords a most nutritious feed, forming hard flesh. Owing to the restrictions on import, necessary for the prevention of the spread of East Coast fever, this migration into the Protectorate territory would undoubtedly at first be difficult to compass, but Dr. Nobbs suggests that at least permission might be obtained for individual experiment and the moving of small "mobs" of cattle in the first instance. The advantages of the scheme do not, however, end with this migration into the Protectorate. The suggestion is that the droves should be moved gradually onwards through a series of cattle posts placed where water has been assured by boring or otherwise as far as the north-eastern borders of South West Africa (a distance of some seven or eight hundred miles, but all veld or high plateau country). They would there be established for a while in a region of about a 22 inch rainfall, admirably suited for finishing. A period of from two to three years might be spent in moving in this way across the continent, avoiding local bad seasons, locusts, etc., and this period should in this way be one of continuous progress without the usual seasonal loss of condition. The final stage would be the entraining, say at Okahandya, on the Windhoek-Walvis Bay railway, and conveyance over the Kalakari desert to the port, about 200 miles. At Walvis Bay, within the last few years, plant has been erected for the killing, dressing and freezing of some 300 head of cattle a day, together with cold storage space for approximately 3,000 tons of frozen meat and other products.

Walvis Bay is the South African port nearest to Europe, and also the nearest of any beef exporting points to the world's principal markets.

(1) Weddell's Review of the Chilled and Frozen Meat Trade for 1926 (*Farmer's Weekly*, Bloemfontein, 4 May 1927)

It serves the whole territory of South West Africa which, apart from the coastal belt, is admirably suited for pastoral industries. In 1922 shortly after the administration of South West Africa was vested, under Mandate, in the Union Government, the potentialities of the port in this respect were realised, and tenders were invited for cold storage and export works. That of the Imperial Cold Storage and Supply, Ltd., was accepted and the works erected, and afterwards made over to the South-West Africa Cold Storage and Stock Farmers, Ltd. All sections of the works are on the most modern designs, and the refrigerating machinery is driven by Diesel Oil Engines of 150 h. p.

The Cold Storage House is placed alongside the wharf for convenience of shipping. The accommodation is much in excess of the present local supply, while the existence of the facilities has created a demand which cannot easily be met locally. Hence the proposal for bringing live meat from the eastern side of the continent for slaughter and shipment is one which might appeal to the Administration and the Union Government. If questions of State or local interests, as well as those of veterinary precautions, can be successfully dealt with, the project should have far-reaching economic effects.

THE SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL AGRONOMY AND TEMPERATE CLIMATE CROPS

A Source of Soil Humidity.

CHAPTAL, L. Sur une source de l'humidité du sol *Comptes rendus de l'Académie d'Agriculture de France*, Paris, 1927, t. XIII, n° 21, p. 695-697.

The trials carried out by CHAPTAL in 1925 and 1926 at the "Station de physique et de climatologie agricoles" of Bel-Air, Montpellier with registering apparatus and Raymond dosimeters have clearly shewn that the chief cause of soil humidity during the hot season is the fixation of atmospheric aqueous vapour on the surface of the soil. This fixation is due to the absorption of this aqueous vapour by plants, plant débris lying on the ground and the surface layers of arable land. Whereas dew formation, properly speaking, is a more or less frequent phenomenon, the above absorption is a regular daily occurrence which may be noted about 2 ½ hours before sunset, when it is no longer cloaked by daily evaporation. The amount of water so afforded to the soil and plants is greatly in excess of that provided by all the other secondary water sources collectively, and is enough to bridge the gap between crop needs and precipitation. The writer's results show that a layer of water of 1-2 mm. per day or 45 mm. a month is so provided.

"Rain" Watering as a Help to Rural Settlement in Germany.

KRAUSE, Die Beregnung im Dienste der bauerlichen Siedlung *Mitteilungen der Deutschen Landwirtschafts-Gesellschaft*, Berlin, 1927, Stuck 21

The rainfall distribution map made by HELLMANN shows that, in the greater part of the East and Centre of Germany, the amounts of rainfall are less than 500-600 mm. a year.

Apart from the quality of the soil, the success of the harvest depends, largely on the amount of rainfall. According to WOHLTMANN (*Arbeiten der D. L. G.*, Heft 97) the ideal amounts of rainfall for winter cereals, potatoes

and mangolds are annually 600 mm., for oats 630 mm., for meadows 670 mm., for pastures 770 mm. Their seasonable and monthly distribution differs according to the crops.

Variations in the yield of crops, independently of the quality of the soil, are very marked in Eastern Germany. The writer has personally been able to ascertain this during the period 1908-1919. He farmed a high land of 47 *morgen* (29 $\frac{1}{3}$ acres) of 6th and 7th class, with no subterranean sheet of water. Without artificial watering his crops varied between 1650 and 6000 kg. for potatoes, between 200 and 600 kg. for rye, between 50 and 500 kg. for oats. The deviations were therefore greater than those established by the statistics of the averages for the region.

Artificial rain i. e. watering by the sprinkling method might have prevented these variations and would also have increased the yield of the land. The lecture given by GERLACH in 1925 has shown the truth of this statement.

The work of FROELICH at Halle and ZORN at Tchechnitz near Breslau has also proved that the application of watering by sprinkling has, in the region of Halle, which formerly had no pastures, made it possible to produce herbage the yield of which exceeded by 50 % (average for 3 years) that of the richest pastures of Eastern and Northern Friesland, that is to say the crop of one *morgen* corresponded to the food value of 1875 kg. of excellent meadow hay.

During a relatively wet year (annual quantity of rain between 1 October and 30 September 635 mm.), this type of watering has still proved very useful. Thus it was possible during the month of June, when there was a rainfall of 25 mm. only to reach the ideal quantity of water required, as established by Prof. WOHLTMANN, by adding, by this method, about 30 mm. of water. Further, it has been possible at the end of the year to record the following results:— the lands not watered had produced (according to the quality of the soil) 397 — 533 — 615 metric quintals of mangolds per hectare; the watered lands 1299 — 1365 — 1288 metric quintals; one cubic metre of water had therefore made it possible to secure an increased yield of over 2.5 quintal.

The same phenomenon was also recorded for lucerne:— artificial watering by sprinkling made three cuttings possible in places where previously there had been one only.

The writer had sent to each owner of his "rain making" apparatus a list of questions regarding the technical and practical results obtained. At the end of the year 1926, which was very wet, he added to it two new questions regarding the relationship between the use of the apparatus and (1) the use of chemical fertilizers; (2) the increase in the number of cattle. He was able to show for Pomerania and Lusatia, that the use of artificial fertilizers had increased by one-third and that in Prussia the number of head of cattle had increased in the same proportion. These results were obtained on properties with intensive cultivation. It is evident that the use of chemical fertilizers might have been doubled on agricultural farms where their use is restricted.

Watering by sprinkling therefore constitutes a *guarantee* of the success

of the harvest in *dry* years and an *insurance* against the danger of abuse of chemical fertilizers in *all* years. The yield of the apparatus for watering by sprinkling is in direct relationship with the extent of land and becomes profitable only when it is applied to a lot of at least 600-800 *morgen* (370-494 acres) ; the writer has succeeded in showing that, on a property of about 648 *morgen* watered by means of the apparatus, the annual net profit per *morgen* is about 34 marks, which allows the cost of installation of the apparatus, including the pump and the motor, amounting to about 25,000 marks, to be paid off in one year.

It is desirable that rural communes should form co-operative societies so as to be able to utilize the apparatus advantageously. Their employment, for which a powerful motor is required, makes possible the use of other more powerful agricultural machines and consequently the realization of other considerable economies in time, money and labour.

The Sulphur Content in certain Cultivated Soils.

BERTRAND G. and SILBERSTEIN, L. Teneur en soufre total de quelques sols cultivés. *Comptes rendus de l'Académie d'Agriculture, de France*, Paris, 1927, t. XIII, n. 20, p. 690-691.

As a preliminary study for the discussion of the problem of the manurial use of sulphur the writers determined the content of this metalloid in 50 samples of cultivated soil from various districts of France, taken usually between the surface and a depth of 30 cm., and also in a sample of soil rich in inorganic substances from the garden of the Pasteur Institute at Paris. The following table summarizes the results.

Sulphur Content of some Cultivated Soils.

Total sulphur in gms per kg. of dried soil	
Pasteur Institute (1 sample) . .	5.175
Seine Inférieure (20 samples) . .	0.912 (Sotteville-les-Rouen) — 3.005 (Hertauville)
Finistère (10 samples) . .	0.466 (Kebernés) — 1.208 (Gonezec)
Calvados (4 samples) . .	0.312 (Hermiroi-les-Vaux) — 0.735 (Blagny-le-Château)
Yonne (7 samples) . .	0.226 (Perrigny) — 0.694 (Charbuy)
Gard (8 samples) . .	0.202 (Beauvoisin) — 0.626 (St Chaptes)

These results show that the sulphur content of cultivated soils in France varies very considerably, sometimes falling to a very low level. The proportion varies to a certain degree with districts, being greatest in Seine Inférieure and least in Gard ; the districts richest in sulphur are also the most fertile.

The above conclusions lead one to suppose that manuring soils containing little sulphur with fertilizers containing sulphur would increase the yields obtained.

The Use of Collodion Sacks in obtaining Clear Soil Extracts for the Determination of the Water-Soluble Constituents.

PIERRE W. H. and PARKER, F. W. (Alabama Agricultural Experiment Station). *Soil Science*, Baltimore, Maryland, 1927, Vol. XXIII, No. 1, pp. 13-32, bibliography.

The writers consider the advantages and disadvantages of different methods of obtaining soil extracts: centrifuging or ordinary filtering with or without the use of flocculating agents, filtration by suction, filtering through Pasteur-Chamberland filters, and dialysis through collodion sacks. The last method, which is short and simple and gives the soil extract in an unaltered condition, has been studied in detail.

Twenty collodion sacks can be made in one hour. A sack can be used several times. The H-ion concentrations of soil extracts obtained by the collodion sack method, of filtered soil extracts determined by the colorimetric method, and of soil suspensions determined by the electrometric method agree well. The collodion sack method, therefore, is of special value where the H-ion concentration of soils is to be determined by the colorimetric method.

The buffer capacity of soils can be determined readily by means of the "Dialysis-colorimetric" method.

Extracts obtained by the collodion sack method have the same concentration of nitrates as do extracts obtained by filtering or flocculation methods. "G Elf" carbon black completely removes the colour of extracts due to soluble organic matter without affecting the nitrate nitrogen of the extract.

The collodion sack method not only offers a new simple method for use in the determination of the water-soluble constituents of the soil, but also offers a means of studying the solubility of the relatively insoluble soil constituents.

Determination of Organic Matter in Soils by Means of Hydrogen Peroxide.

• ROBINSON, W. O., *Journal of Agricultural Research*, Washington, D. C., 1927, Vol. 34, No. 4, pp. 339-356, 8 tabs., bibliography.

The ordinary combustion method of determining soil organic matter is not entirely satisfactory. The writer gives a detailed account of his experiments for determining this by H_2O_2 . He discusses his actual method, and the actual results of soil decomposition by H_2O_2 , comparing those given on different soils, and examining the nature of the undecomposed organic matter under the ordinary and the H_2O_2 system.

Among other criticisms on the methods he remarks :—

That the H_2O_2 method is easy of manipulation but not more so than the combustion method.

That it is not applicable to soils containing more than 2-3 % calcium carbonate or more than traces of manganese dioxide or of chromium sesquioxide.

That as a means of determining the total organic matter of soils it is about equal to the combustion method with the advantage that its results always err on the low side and the errors are usually small.

That there is no certain evidence that it determines any clearly defined kind of organic matter. Thus some of the carbon will be decomposed, some will not, the amount varying from soil to soil.

That it cannot be used to determine the readily available organic matter.

That for routine analysis it offers no advantage over the combustion method. But where an accurate determination of the organic matter is required, as in determining the water which is combined with the inorganic material of soils, a combination of the hydrogen peroxide and of the combustion methods offers distinct advantages. If the carbon in the residue from the H_2O_2 digestion were determined by combustion and then added to the organic matter determined by H_2O_2 , the sum would be a more accurate figure for the total organic matter than the value given by any existing methods.

Use of Distillery Residues for Preparation of Artificial Manure.

HINCHY V M Synthetic Pen Manure Use of Distillery Sludge *Tropical Agriculture*, St Augustine, Trinidad, 1927 Vol IV, No 7 p 129

For the preparation of the so-called synthetic pen manure, obtained by the rapid humification of vegetable refuse, the author has experimented in the use of distillery residues (from rum making) as fermentation agent. These were applied to cane loppings and refuse piled up in the open, to cane trash mixed with powdered lime, to stable manure from stalls in which oxen have been kept for six weeks, to the giant species of the *Gramineae*, "bamboo grass" (*Glyceria ramigera*; *Stipa micrantha*), both cut up into portions and otherwise. Fermentation was rapid and the degree of humification as determined by the oxygenated water was satisfactory. This valuable use of distillery residues has the further advantage of avoiding the contamination of the watercourses into which distillery refuse water is discharged.

Silage Crop and other Trials at Salisbury, Rhodesia.

ARNOLD, H. C. Annual Report of Experiments 1925-26 (cont^d) *The Rhodesia Agricultural Journal*, Salisbury, Rhodesia, 1927, Vol. XXIV, No 6, pp. 653-662. illus.

Maize has invariably given the most satisfactory results at this station as the basis of all silage mixtures.

Maize and velvet beans (*Stizolobium* sp.) have proved a very successful mixture. The maize should be planted about 2 weeks before the velvet beans.

Sunflowers and velvet beans are another normal mixture.

When the harvesting of sunflower seed occurs at the same time as silage making, the deseeded sunflower heads as well as the upper part of the stalks are sprinkled slightly with water and are added to the other fodder put into the silo. Other silage mixtures used successfully are:—Niger seed (*Guizotia oleifera*), Sudan grass and Kokoma grass, either alone or mixed with legumes.

Niger seed given a good soil and adequate rainfall will yield up to 20 tons of green fodder per acre which is ensiled when the flowering has nearly finished. Sudan grass is cut when in flower or slightly earlier if the vegetative growth is well advanced. Kokoma grass, cut at approximately the same stage, is a very vigorously growing annual and unless watched may be a troublesome weed in cultivated land.

Liming Trials. — So far these have only yielded inconclusive and conflicting results.

Ground Nut Trials. — Trials over 7 years show that the best yield is obtained by planting in rows about 18" apart and spacing to 6" in the rows. The "Bunch" rather than the "Runner" types (the names referring to their habits of growth) have been proved the most profitable to grow for commercial purposes.

Tobacco. — Three new varieties with thick or heavy leaves and therefore only suitable for fire curing were successfully tried. They were "One Sucker", "Kentucky Yellow" and "Little Orinoco", the last named giving the best results.

Sesbania cinarescens. — This is a very hardy, quick growing leguminous shrub. Planted experimentally in November 1925, at the end of April 1926 the plants were over 10 ft. high and in June 12-15 ft., with average stem diameter of 1 1/4" at 6" from the ground to 1" at 6' from the ground. A few were cut and will be tested for use as tobacco sticks.

The Effect of Sub-Optimal Water Content on Plants during the various Growth Phases.

CHIRITESCU-ARVA, M. Der Einfluss des optimalen Wassergehalt des Bodens auf die Pflanze während verschiedener Entwicklungsstadien — *Fortschritte der Landwirtschaft*, Wien und Berlin, 1927, 2 Jg Heft 15, S 489-493, 8 Tab.

The writer's experiments were carried out on summer wheat, variety "Beloturka" (*Triticum durum melanopus*), in three series of trials, for each of which the plants were grown in four containers of rolled zinc. The problem was to determine at which stage of development the growth factor "water" has the greatest influence on yield, and to ascertain the effect of different quantities of water during the various growth phases.

For this purpose the total growth period of the plants was subdivided into three experimental stages and water was supplied according to the following table.

TABLE I.

Trial period with water as optimum	Trial period		
	I Green-shoot period	II Earshooting period	III Ripening of ear
Series III	20 % Water	20 % Water	50 % Water
» II	20 % »	50 % »	20 % »
» I	50 % »	20 % »	20 % »

The following table will show more clearly the results of the above trials. The first column shows the vegetative periods in which — in the above conditions — the quantity of water given has produced the *most* beneficial effect on any specified yield factor, while the second column indicates the periods in which the water-optimum may have a favourable effect on any such yield factor

TABLE II.

	Trial period in which the water optimum had the most beneficial effect on the specified yield factor	Period of trial in which the water optimum is favourable to the specified yield factor
Number of ears per plant	I	—
Total length of the ears of single plant . . .	I	II
Average length of an ear.	I	II
Total number of spikelets on single plant . . .	I	—
Number of fertile spikelets.	I	II
Development of fertile spikelets.	II	III
Density of spikelets	II	—
Number of grains per single plant and ear . . .	I	—
Density of grains	II	—
Number of grains in single spikelets	II	I
Weight of ears in single plant	I	II
Average weight of an ear	I	II
Grain weight per single plant and ear.	I	II
Weight per 1000 grains	II	III
Development of ears and grains in proportion to total yield.	II	—
Development of parts above ground and of grains in proportion to weight of ears.	II	—

New Investigations on the Assimilation of Biogenous Elements by the Roots of Agricultural Plants.

STOKLASA, J. Nove výzkuny o asimilaci biogenich prvků kóran, im rostlin kulturnich. *Vestník Československé Akademie Zemědělské*, Prague, 1927, V. III n. 3, p. 242-255 (abstract in German pp. 251-254).

The problem of the method of absorption by roots of the more insoluble mineral substances of the soil is still unsolved. One theory is that roots excrete not only carbon dioxide but also other acids, which, like the former, can transform the more insoluble inorganic substances into assimilable forms. Another, shared by the author, is that only carbon dioxide is segregated by the roots and that this makes soluble the more insoluble inorganic substances. The writer's recent experiments have put the question in a new light and the results obtained are summarized in this article.

Species	pH of root juice	Mgm of CO ₂ produced by 1 gm of roots in 24 hours (calculated on dry matter)	Millions of live micro-organisms in 1 gm soil (calculated on dry matter of the rhizosphere)	Mgm of CO ₂ produced by 1 kg soil (dry matter) in 24 hours at 20°C and 25 % moisture	pH in the rhizosphere soil of the individual agricultural crops
<i>Zea Mays</i>	6.4	125.5	62	70.6	6.32
<i>Triticum vulgare</i> . . .	6.0	74.6	49	68.4	6.73
<i>Secale cereale</i>	6.8	110.8	42	68.2	6.44
<i>Hordeum distichum</i> . . .	6.9	70.5	51	61.3	6.59
<i>Avena sativa</i>	6.6	118.9	45	59.0	6.42
<i>Beta vulgaris</i>	6.4	130.3	78	74.3	6.89
<i>Solanum tuberosum</i> . . .	7.0	82.3	46	58.5	6.50
<i>Medicago sativa</i>	6.8	160.5	120	86.8	6.89
<i>Trifolium pratense</i> . . .	6.6	146.8	98	82.4	6.66
<i>Polygonum Fagopyrum</i> . .	6.2	128.0	63	78.7	—

The points investigated are shown in the above table, which gives the averages of numerous determinations.

It is seen that the pH of the root juice of the different kinds of plant hardly varies; the acidity is not strong enough to be the sole cause of the absorption of the less soluble constituents. It increases with increasing difficulty in respiration due to lack of atmospheric oxygen. Under normal conditions the roots produce only carbon dioxide, but in the presence of insufficient oxygen they may form lactic, acetic, formic and oxalic acids.

Carbon dioxide emission by the roots is entirely due to physiological combustion in the plant; expiration takes place also in completely sterilized soil.

Different plants possess different respiratory energy, corresponding with which is a different potentiality for absorption of the less soluble nutrient materials (phosphates and finely ground silicates of potassium).

Cereals have greater power of absorption of anions (phosphorus) than of cations (potassium, magnesium; calcium); the opposite applies to beets and potatoes. The leguminosae have the peculiar property of being able to turn to use equally cations and anions. Herein is a fundamental biologic factor in favour of rotations.

In well cultivated plough land in the presence of organic substances (hemicelluloses, pentosans) the soil micro-organisms produce considerable segregation of carbon dioxide and of organic acids (acetic, butyric, formic etc.) which render soluble phosphates, silicates, etc. This process is specially noticeable in summer.

There is admittedly a connection between the expiration of carbon dioxide by the plant root system and the cooperation of the rhizosphere microorganisms towards a better capacity for utilizing the soil constituents. A consideration of the entire mechanism of the absorption of nutritive substances, for example in cereals, shows that the respiratory intensity of the system has not energy enough for the assimilation of the necessary anions. In the process of decomposition of phosphates, carbonate (in certain conditions bicarbonate) of calcium is always formed, which decreases phosphoric acid absorption.

The organic acids produced by the exchange of materials by the micro-organisms neutralize the carbonates in the soil, and the carbon dioxide from these helps in the breaking down of the phosphates. In sugar beet, potatoes and the leguminosae the breaking down of the silicates is greatly helped and the carbonates of potassium, calcium and magnesium which are formed are changed into bicarbonates, in which form they can easily be absorbed by the root system. At every stage where the root system shows little aptitude for the absorption of nutritive substances, the micro-organisms help to make this absorption possible.

The roots absorb ions qualitatively and quantitatively different according to their own specific physiological properties.

The absorption of the individual ions of the less soluble mineral substances is brought about by the carbon dioxide from the roots as well as by the carbon dioxide and the organic acids produced by the micro-organisms. All cultivated plants, which in a given growth period form the greatest number of calories, have also a greater root respiration intensity. This absorption of inorganic soil substances bears a certain relation to the assimilation of atmospheric carbon dioxide. The assimilation of atmos-

spheric carbon dioxide and the absorption of the inorganic nutrient constituents of the soil, *i. e.* the entire work potentiality of the plant, naturally depend on the climatic growth factors.

The absorption of the inorganic nutrient substances of the soil bears a fixed relation to the synthesis and the decomposition of carbohydrates, fats, phosphatids, nucleoproteids, albuminoids and other organic compounds.

Mathematical laws govern the relationship between assimilation of atmospheric carbon dioxide and the absorption of the inorganic soil constituents throughout the mechanism of the building up of new masses of living plant tissues.

In an appendix the writer gives a list of nine of his important works, the conclusions of which have been brought together in this article.

Investigations on the Lesion Hormones of Plants.

WELMELT, B. Untersuchungen über das Wundhormon der Pflanzen. *Jahrbucher für wissenschaftliche Botanik*, Leipzig, 1927, Bd. 66, Heft 5, S. 773-812.

The intention of the author was to obtain a further comprehension of the lesion hormones discovered by HABERLANDT. Experiments on the young pericarp of *Phaseolus* which forms an excellent subject for experiment gave the following results:

(1) The cell sap of young leaves of *Phaseolus* applied to the inner side of the pericarp stimulated a cell growth with very considerable cell division.

(2) Filtered cell sap retains these properties; the results arrived at by REICHE as to the effective factor being removed by filtration were thus not confirmed.

(3) Extracts with water, with 70 % alcohol, and with 97 % alcohol, proved to be effective, contrary to the results of REICHE's experiments, in the case of which no effective extracts were obtained. About 20 % of the material possessing the property was retained by the filter.

(4) With normal acid reaction the fresh cell sap retained a constant temperature; with alkaline reaction heating under pressure and higher temperature resulted in an evident reduction of the effect.

(5) Other kinds of organic material, such as white of egg (hens), horse serum, haemoglobin, deutoalbumose, preparations of insulin, and agar-agar also showed intensive effects.

(6) The division reaction was in direct proportion, and the growth reaction in indirect proportion to the quantity of stimulating material.

The new structures resulting from the application of the stimulating material consisted without exception of parenchymatous tissue.

Wet or Dry Pre-treatment of Seed.

WESTERMEIER K., Nass- oder Trockenbeize ? *Pflanzenbau*, Berlin, 1927, 3 Jg. Nr. 23, S.366-369.

The advantages and disadvantages of the two pre-treatment methods are discussed in detail in this article and the writer's theories on the matter supported from his own experiments.

In the writer's opinion theoretically dry pickling is superior to wet, as not only does it kill the spores actually on the seed but also those existing in the ground close to the planted seed. But in practice this goal is only partially reached. Actually the great disadvantage of the dry method is that the action of the pickling agent takes place in the soil out of the reach of human influence and so depends on the caprice of nature. It may so happen that the dry powder is washed off the seed by rain almost at once, with the result that the seed lies in the ground in exactly the same condition as though it had never been treated.

As well as by observations in the field the writer's theory has been proved by a laboratory experiment which consisted in putting the dry pickled seed in 5 pots containing moistened sand and covering it with 4 cm. of brick dust. The result is shewn in the following table :

		Percentage germination
		—
Pot 1	Control, untreated	0
» 2	Dry pickling ; not watered	74
» 3	Dry pickling ; watered after 5 hours .	40
» 4 and	Dry pickling ; watered after 18 hours .	39 and 34

The above and all his other experimental results show that the effect of dry pickling followed by untimely rain, if not entirely lacking, is at least greatly weakened thereby. His experiments also show that wet pickling gives more certain results under like circumstances. Moreover he proved that dry pickling is useless against *Fusarium* when the powder is washed off, a fact that leads to the conclusion that such is also the case under like circumstances as regards all other disease spores, which have to be controlled by pickling, such as Stinking Smut of wheat, barley Stalk Smut and Loose Smut of oats.

The writer advises farmers to continue the wet method so long as the dry method gives results which are affected by rain.

Influence of Desiccation and Moistening of the Soil at different Stages of Vegetation on the Growth and Yield of Cereals.

MOLIBOGA, A. *Trudni pa prikladnoi botanike i selekzii* (Bulletin of Applied Botany and Plant-Breeding), Leningrad, 1927, Vol. XVII, No. 2, pp. 183-200; English Summary pp. 201-202

The following is an abstract of the author's English summary :

The purpose of the present investigation was to establish experimentally the critical periods for wheat and barley in regard to drought. Numerous observations have long shown that the greatest susceptibility to unfavourable environmental conditions is shewn in the period which directly precedes the shooting and earing stages. But as the influence of the different external factors is very complex, observations made under field conditions only are not sufficient to solve the question, and experimental investigation becomes necessary.

The writer applied the wilting method proposed by Prof. N. A. MAXIMOV (alternative waterings and wiltings) to spring wheat Marquis (*Triticum vulgare lutescens*) and two-rowed barley (*Hordeum erectum anglicum*).

For wheat the following results were obtained: taking the grain yield of the control plant as 100 the yield will be 137 for the plants subjected to wilting in the tillering stage, 50 for those in the shooting stage, 34 in the earing stage and 77 in the stage of milky ripeness. Thus the most dangerous period as regards the grain crop is the early earing stage. In regard to the total amount of dry substance, a different picture is obtained, plants subjected to wilting in the tillering stage yielding a crop of 113, in the shooting stage 87, in the earing stage 103 and during the filling of the grain 89. Here drought is most dangerous in the shooting stage. This divergence of results is due to the fact that after drought renewed tillering is observed, which leads to the formation of a great number of late ears.

Experiments with barley have shown that this cereal is less susceptible to drought than wheat. The grain yield of the plants subjected to wilting in the tillering stage constituted 98 % of that produced by the controls; plants having wilted in the shooting stage produced 95 %, in the earing stage 47 %, in the stage of milky ripeness 100 %, *i. e.* the same as that of the control plants. As in the case of wheat, the critical period is also the time preceding the appearance of the ear and is very strongly marked. No stimulating influence of drought during the tillering stage was observable.

In addition to the wilting experiments, other experiments were conducted in which the plants were grown under conditions of insufficient soil moisture (30 % of the full water-holding capacity) with subsequent moistening of the soil to optimum conditions that were maintained until

the close of the growing period. This moistening was begun in the different series at different times, in one series from the start of tillering, in the second from the beginning of shooting, in the third, of earing, in the fourth of milky ripeness. The increased soil moisture led to increased yield in the plants of all series, with the exception of those which had already attained milky ripeness and for which the improved water supply had been too late. The greatest effect was obtained through moistening in the shooting stage, *i. e.*, the critical period in regard to drought. Thus the data of the moistening experiments confirm those obtained in the wilting experiments.

The Storage of Mineral Matters, of Total and Protein Nitrogen and of Starch during the Ripening of different Wheats.

TOULAIKOFF N. M. and PISAREVSKI N. F., Nakoplenie soli, obchtchevo i bielkovovo azota i krachmala pri sozrievanii razlichnich pshénitz. *Journal opitnoi agronomiki iougovostoka* (Journal of Agricultural Research of the South East), Saratov, 1927., tome III, fasc. II, p. 17-50 (English abstract).

The writers give the following short account of the work of the chemical laboratory which is attached to the selection fields of the Agricultural Experimental Station of Saratov.

(1) The material for the research on the storage of ash, of total and protein nitrogen and of starch was provided by pure lines of wheats grown on the fields of the Selection Department of the Saratov Experimental Station.

(2) It was taken several days after the grain had started to develop, further samples being taken every other day and analysis being made in the usual manner.

(3) The percentage of ash and total and protein nitrogen in the grains of spring wheat decreases from the first development of the grain up to its maturity. On the other hand the amount of starch increases with the approach of maturity.

(4) The percentage of nitrogen in wheat grains is inversely proportional to their starch content.

(5) No distinction can be made between hard and soft wheat according to their content of nitrogen and of starch and there is no relation between the vitreous state of the grains and the amounts of nitrogen and starch contained.

(6) Under equal conditions of soil and climate different wheats store different quantities of dry matter per hundred grains. The maximum difference between the total weight of a hundred grains and of their dry matter is found to exist between two forms of smooth-awned soft wheat.

(7) It has been possible to determine in nearly every case and for every kind of wheat that the maximum amount of dry matter in the grain is not to be found at the end of its ripening, but before. Towards the end of the ripening process the weight of the grain decreases owing to the introduction of certain unknown processes.

(8) The speed of storing starch and protein nitrogen decreases gradually with the progress in development of the grain. The relation between the amount of albumin and of starch which flow towards the grain is not a constant.

(9) During the waxy stage of ripening soft wheat grains store nearly 95 % of their final weight. The *erythrospermum* wheat is an exception and resembles the hard wheats which store 62-77 % of their final weight during this stage of ripening.

(10) The method of storing dry matter, protein nitrogen and starch in the grain is quite characteristic in the two sorts of wheat which follow, viz.: *erythrospermum* which stores very rapidly during the first phase of ripening and "subaustral" where this process is very gradual and only finishes on the eve of harvest. The process is much the same for other sorts of wheat, but the absolute amount of the substances which combine to form the grain varies considerably in the different sorts.

(11) It is practically impossible to determine the differences existing between the process of ripening in hard wheats and that in soft wheats. Such a difference is more perceptible between two different sorts of rough-awned soft wheats than between hard wheats and soft wheats. Nevertheless great varieties in the characteristics of the ripening processes can be determined in the different varieties of wheat.

(12) The removal of the awns of *hordeiforme* hard wheat has no influence at all on the process of storing the different substances during the ripening of the grain.

Increase of the Dry Matter Content in the Grains of Different Spring Wheats and the Utilization of Undeveloped Grain as Seed.

MEISTER G. K., CHÉCOURDINE A. P. and PLOTNIKOFF N. I., Prirost souchovo vechtchestva zerna on rasilnichnch pchénitz i ispolzovanié nedorazvito vo zerna dlia posléva v. polié. Sz. Ratot Selcktsionnovo Otdiéla Saratovskoi Stanzii. *Journal opitnoí agronomiki i ongo-vostoika* (Journal of Experimental Agronomy of the South-East, Saratov, 1927, v. III, n. II, p. 134-153 (German abstract p. 172).

The following are the writers' principal conclusions:—

(1) The researches on the increase of the content in dry matter in the grains of different botanical and biological types of wheat made during 1921, which was a dry year, and during the year 1922, which was a favourable year for crops, have established that the aridity of the soil and high

temperature which characterize dry years accelerate the process of the accumulation of dry matter in the grain and considerably reduce the ripening period. The same conditions shorten the duration of the growth of the grain after flowering up to the maximum accumulation of dry matter, the quantity of which diminishes under the influence of drought. The researches carried out on different kinds of wheat established the fact that characteristics vary considerably according to kinds.

(2) The development of the grain of wheat during the period of growth is governed by the general biological law expressed by the growth curve. During the first few days following flowering, the grain grows very quickly, but, gradually with the accumulation of dry matter, the rate of growth diminishes, after having probably attained its culminating point towards the beginning of the phase of "waxy" maturation. After the passing of this phase, when the grain approaches complete maturity, it appears that a slight expenditure of dry matter takes place, which would explain the reduction of the absolute quantities of this matter in the grain. It should moreover be noted that the processes of accumulation of dry matter and of maturation differ considerably according to the biological types of wheat. Generally, the accumulation of dry matter is more regular in hard wheats than in soft, for which it is expressed by a steeper curve, as is the case, for instance for Turkestan wheat (type *rigidum* Vavil.). The peculiarities of the process of the accumulation of dry matter in the grains in different biological wheat types open up to the selector wide possibilities for the establishment of the most appropriate types for the dry region of the Volga.

(3) The artificial removal of the awns after formation of the ears of hard wheat of the pure line N. 432 v. *hordeiforme* did not in any way influence the accumulation of dry matter and its absolute quantity in the grain. The better maturation of bearded forms of wheat is probably explained by an unknown biological quality which is peculiar to them. It would be interesting consequently to repeat the same experiment with soft bearded wheat.

(4) Experiments on the use of grains at different phases of development for sowings have given the following results — incompletely developed grains can be sown without detriment to the crop. In case of necessity incompletely formed grains can be used as seed, but in this case, besides their absolute weight and their germinative faculty, the whole of the unfavourable conditions in which the weak plants have to grow and develop must be taken into consideration. It would therefore be necessary to increase by 40 to 50 % the quantity of grain theoretically necessary for the sowing. It is also preferable to have recourse to superficial broadcast sowing provided that the humidity of the ground is optimum.

(5) To obtain a maximum yield in grain from spring wheat it may be harvested during the phase of waxy maturation. It is probable that these grains used as seed will give a higher yield than will grains harvested at full maturity. This question however requires further testing out.

Improvement of Cultivated Wheats in Cold Districts of France.

I — SCHRIBAUX Les meilleurs blés à cultiver en régions froides, dans l'Est en particulier. Les étapes à parcourir *Comptes rendus de l'Académie d'Agriculture de France*, Paris, 1927, tome XIII, n° 17, p. 578-587.

II — JANNIN L'amélioration des variétés de blé en Côte-d'Or *Ibidem*, p. 587-591.

I. — M. SCHRIBAUX, on presenting to the Académie d'Agriculture de France M. JANNIN's note, expresses his opinion on the improvement of wheats in the cold districts of France, particularly in the East, and the steps which must be taken before one can realize an increased return due to the fact of employing better varieties. Among his other conclusions are the following :

The production of wheats combining the resistance to cold of the native wheat with the productivity of high yielding varieties must be expected from crossings rather than from selection methods. The mildness of the winters for the last 20 years has made it impossible to test the cold resistance of the hybrids created by the writer at the Paris " Station d'Essais de Semences " : Rouge d'Alsace × Shirriff's square head — Rouge d'Alsace × Bordeaux — Blés Martinet (Bretonnières, Vuiteboeuf, XXII, Epi carré vaudois) crossed with different high yielding varieties.

The work must be restarted from the beginning. The creation of altitude stations, already established by the Agricultural Research Service, will be of great assistance and will allow the new hybrids from the second and third generation to be submitted to graduated and sufficiently formidable degrees of cold so as to rid the selectionist of weak individual varieties.

The creation of the hybrids will demand not less than 10 years. For an immediate increase in production the writer advises the following steps :

1) The new selected native wheats (Alsace, Mouton, etc.) and good varieties, said to be cold resistant, should be submitted to collective and concerted trials carried out by the Stations and the Offices of the district concerned with a view to the quickest possible discovery of the two or three best among them.

2) In sowing, a third of the wheat sown including the native varieties should be high yielding wheat. The effects of a very severe winter may be nullified by the application of 150-200 kg. of nitrate at the beginning of growth. In places where the yield amounts to 15 hectolitres per hectare preference should be given to Goldendrop and to Epi carré vaudois, which are good yielding varieties and of average resistance to cold. Where the yield reaches about 20 hl. per hectare Vilmorin 23, Hybride Inversible and G 4 of the Central Station of Genetics should be used. In rich deep soils which produce 25-30 hl., native wheats should be entirely replaced by high yield varieties. Where wilting is to be feared, Golden-

drop should not be used, being a late variety. In this case the use of G 4 of the Central Station of Genetics, the earliest of the series, is strongly advised. Hybride Inversible, 23 and G 4 are the most prolific and the most resistant to lodging.

These last principles have already been successfully practised in the Côte-d'Or and other places.

II. Far the most common wheat in the Department of the Côte-d'Or is a very old local variety called Mouton or Moutot. It is a soft wheat with a white or salmon coloured ear, with red grains highly valued by the millers, with fine straw which is very suitable as fodder for cattle in winter. It is extremely resistant to winter cold and to rust and its early ripening allows it to escape wilting. It is not a pure variety or definitively fixed and several lines have been isolated, namely: Blé de Louesme with 4 sub-varieties — Blé rouge de Sennevoy — Blé hâtif de la Saône

The following programme might well be considered:

1) Improvement of local varieties by genealogical selection. Pure lines of these varieties must be used either as direct producers or for the purpose of crossing. This operation is already well in hand.

2) Hybridization between these native varieties and stocks possessing the necessary qualities

Four types at the maximum ought to be looked for: (1) in soils which are dry and of little depth on the Plateaux du Châtillonnais and de la Montagne: a type of selected Mouton — (2) in soils of average fertility of the Dijonnais and Auxois: the Mouton-type but with unawned straw and of high yield — (3) in the valley of the Saône: Hâtif de la Saône type, but resisting "take all" and lodging — 4) for deep rich soils: Alsace type in the Châtillonnais (valley); Hâtif Inversible type, but frost resistant, in the Dijonnais plain

Improvement of Winter Oats.

CRÉPIN (Directeur de la Station de recherches agronomiques de Clermont-Ferrand). Note sur l'amélioration de l'avoine d'hiver *Comptes rendus de l'Académie d'Agriculture de France*, Paris, 1927, t. XIII, n° 21, p. 719-724.

Winter oats, more productive than the spring varieties, are more subject to lodging in rich soils. To remedy this defect the writer had recourse to crossing and selection. The oat "grey winter" was crossed with "Ligowo-Brie 176" of the "Station d'essais des Semences" of Paris, well known for its culm rigidity.

Although the crossings are rather recent, the writer has been able to ascertain that the hybrid is placed, for sensitiveness to cold, between the two parents and nearer to the winter variety than to the other.

Selection was applied to the oat "grey winter" which constitutes a population. The writer has isolated two lines:— "Winter 4" and "Winter 5" both characterized by very rigid straw and by a very low proportion of awns.

The writer has observed during this work that all winter oats when they have 2 or 3 leaves have a very different appearance to that of spring oats, from which they are distinguished by the relative length of the first leaves, by their shape, length and bearing. It appears that at this stage of growth the special appearance of the winter oats is in correlation with their resistance to cold. In this case, it would be possible to distinguish the individuals more resistant to low temperatures by the morphological characters of the first leaves, which would much facilitate the work of the genetist.

Types of *Beta* L. Species.

TRANZSCHEL, W. Obzor vidov roda *Beta* L. *Trudni pa prikladnoi botaniche i selekzii*, Leningrad, 1927, Bd, XVII, Nr. 2, S. 203-220 (German Summary p. 221) 10 tafeln.

The writer has carried out a revision of the types of *Beta* species, dividing them into 3 groups, which have different geographical distribution and also may differ in their morphology:— *patellares* (Canary Isles, N. W. Africa, Southern Spain) — *vulgares* (Mediterranean, Denmark, Canary Isles, Madeira, the Azores) — *corollinae* (Caucasus and Asia Minor; with a variety *B. trigyna* reaching as far as Hungary).

Ethylene Chlorohydrin Treatment for Delayed Dormancy in Potatoes.

Delayed dormancy as a probable cause of uneven stands in planted potatoes. *American Journal of Botany*, Lancaster Pa., 1927. Vol. XIV, No. 5, pp. 284-286 and plate.

An experiment on the efficacy of ethylene chlorohydrin as a pre-treatment for potatoes liable to delayed dormancy.

The potatoes treated were allowed to soak for an hour in a solution of 60 cc. of ethylene chlorohydrin in a gallon of water and afterwards stored for 16 hours in a covered container. They were then cut and planted.

A fortnight afterwards, whereas only 19 % of the control plants had appeared above ground, 71 % of those from the treated tubers were visible. The development of the latter continued throughout to compare favourably

with that of the former and much greater resistance was shewn to the many adverse conditions of a bad season.

When planting varieties of potatoes such as "Early Ohio" and others subject to delayed dormancy, pre-treatment with ethylene chlorohydrin appears largely to obviate the difficulty.

Meadow Hay in Districts of Western Australia with a Rainfall of 20-30".

BARON-HAY, G. K. *Journal of the Dept of Agriculture of Western Australia*, Perth, 1927, Vol. 4 (2nd series), No. 1, pp. 83-88

The introduction of subterranean clover and of phosphatic top dressing has facilitated the growth of meadow hay in these districts.

Owing to the normally dry summer only annual grasses which produce liberal seed have been found to do well. Such are Silver grass (*Festuca* sp.) and Soft Brome (*Bromus mollis*) neither of which do well on pastures. Clovers recommended are:— Cluster Clover (*T. glomeratum*) Yellow Suckling (*T. minus*), Native Hop Clover (*T. procumbens*) also *Lotus major*, but above all Subterranean Clover (*T. subterraneum*).

It does not usually pay to cut a first year's crop of subterranean clover for meadow hay but it is better to allow the plant to seed liberally and graze the roughage.

For an early and prolific growth an application of phosphatic fertilizer is essential and the practice is recommended of top dressing with 1 cwt. of supers per acre early in the autumn with or before the first rains, following with a second similar topdressing in spring. Where the presence of the Lucerne Flea (*Sminthuris viridis*) and the Red-legged Earth Mite (*Penthaeus destructor*) is suspected, topdressing should be delayed till after their first appearance and should then be done with supers to which has been added $\frac{1}{3}$ of its weight of 15 % carbolic powder.

Stock may be grazed on the area to be hayed until well into the winter, but in this case the 2nd dressing of phosphate should never be omitted.

The crop should be cut when the clover is just past its full bloom. Where, owing to the creeping habit of the plant, the runners hang on the outside point of the "cut" causing sidedraft and eventual clogging of the knives, a scythe blade with cutting edge upwards may be fixed on the "pointer" separating the crop. The runners passing along this blade are then cut.

Yields should be $1\frac{1}{2}$ up to 2 tons per acre which is quite equal to those of meadow hay based on cereal crops instead of on subterranean clover.

***Paspalum dilatatum* (Poiret), a Useful Permanent Pasture Plant.**

CARNE, W. M. and GARDNER, C. A. *Journal of the Dept of Agriculture of Western Australia*, Perth 1927, Vol. V (2nd Series), No. 1, pp. 157-159

This perennial grass is a native of S. America. It is now extensively grown, especially in low moist situations in Western Australia.

Its capacity to stand up to heavy stocking in the summer is unsurpassed.

Where sown with Dutch White Clover, (*Trifolium repens*), the two grow well together and form a good ration.

Seeding is normally in the spring, 10-12 lbs. *Paspalum* to 1-2 lbs. Dutch White Clover.

Fertilizer recommended is 1 ½ cwt. of supers and ¼ cwt of S/A. Stock should be removed during the growing season each year and top dressing in the early spring with 1 cwt supers and ¼ cwt of S/A is strongly recommended.

So called "seed" consisting of the dried florets has not hitherto been very satisfactory. A good average sample should have 40 % or more of formed seed and a bushel weight of over 28 lbs.

Timber and Fuel for Tobacco Growers in Southern Rhodesia.

HENKEL, J S (Forest Officer), *The Rhodesia Agricultural Journal*, Salisbury, 1927, vol XXIV, No 6, pp 627-633

A supply of timber is essential to the tobacco grower and he must therefore plant up accordingly.

Plantations of Mixed Red Gum (*Eucalyptus rostrata*) and of Forest Red Gum (*Eucalyptus terebinornis*) have been made and kept under observation as to the amount of timber produced. The results taken from 4 such plots show that an acre so planted should at different ages contain the following volumes :—

5 years	1200 cubic feet or	15	cords
6	»	1470	» » » 18.3 »
7	»	1740	» » » 21.7 »
8	»	2010	» » » 25.1 »
9	»	2280	» » » 28.5 »
10	»	2550	» » » 31.8 »

These estimates are based on well stocked stands growing under good conditions.

A grower should know the amount of indigenous wood available and its probable duration so that he may plant up accordingly against the future.

If for example a volume of 60 cords per year is required and a 5 year

rotation is used (N. B. a longer one is better), there should be 20 acres planted of which at the end of 5 years 4 acres will be 1 year old, 4 acres 2 years old, etc.

The crop on the 5 year old plot should be cut as wanted in the summer, removed and stacked. This removal will allow proper coppice growth in late summer and early winter. Where climatic and soil conditions are specially favourable, faster growing trees such as the Sydney Blue Gum (*E. saligna*) and the Botryoides Gum (*E. botryoides*) can be grown.

At present the increased tobacco cultivation demands adequate measures for husbanding existing resources. The present rate of $\frac{2}{3}$ cubic feet of wood used in curing 1 lb. of tobacco seems excessive.

Even if tobacco growing for any unforeseen reason languished, plantations primarily established for fuel could be managed for timber production instead, and so in any case would be a profitable investment.

Cotton-growing in Spain.

FERNÁNDEZ, E. El cultivo del algodón en España — y XVII, n 387, p 215-216 *La Información agrícola*, Madrid, 1927

Spain stands eighth among nations consuming cotton, coming after the United States, Great Britain, India, Japan, Germany, France and Italy. As the value of the annual importation is 400 to 500 million pesetas and as cotton has for several centuries been grown in Spain, the Government has taken steps to give an impulse to cotton-growing by means of the constitution of the "Comisaría algodonera del Estado".

By the R ordinance of 5 November 1923, the importation, circulation and sowing of cotton seed not inspected by the executive Committee of the State Commissariat for cotton was prohibited. With the object of preventing damage from cotton diseases and pests only such seeds as are distributed by this Commissariat may be sown.

This distribution is gratuitous; in addition the Commissariat purchases all the cotton produced. The purchase price for 1927 was fixed at 1.20 pesetas per kilogram of unginned cotton. Cotton-growing is profitable in Spain when the yield in unginned cotton amounts to 400 kg. per hectare. The cost of production varies from 350 to 800 pesetas per hectare.

The writer has for many years carried out experiments in cotton-growing with or without irrigation in the "Granja Escuela de Agricultura" of Badajoz; in 1925 he obtained in the non-irrigated plot 1390 kg. per ha. of unginned cotton.

Production of Esparto grass in Spain.

Comunicaciones del Comité Informativo de producciones agrícolas *Boletín de Agricultura técnica y económica, Sección oficial e informaciones*, y. XIX, n 221, p 426 and 428. Madrid, 1927

The area under esparto grass in Spain in 1926 was estimated, on the basis of data furnished for each province by the respective Agricultural

Services, at 620,000 ha. yielding 1,035,000 quintals of the value 11,700,000 pesetas (in round numbers). The province of Almería stands first with 200,000 ha. and 180,000 q. followed in order by that of Granada (126,000 ha., 275,000 q.), Murcia (100,000 ha., 150,000 q.), Albacete (97,000 ha., 145,500 q.), Toledo (46,000 ha., 115,000 q.), etc. In 1925 418,420 q. of raw esparto grass and 11,237 q. of manufactured esparto grass, of respective values of 6,694,720 and 393,295 pesetas, were exported while 17,190 q. of raw esparto were imported. The export trade is with Great Britain, France, Holland, Belgium, Portugal, Morocco, South America and the United States. The imports come almost entirely from Algeria.

Approval of Vine Cuttings, etc., in Germany.

ZIEGLER, A. Zur Rebanerkennung. *Wein und Rebe*, Mainz, 1927, Jahrg. 9, Heft 4, p. 186-189.

According to the author, the object of the approval of vine cuttings introduced in 1921 by the German Farmers' Association was to provide vine growers with vine shoots coming from good and selected stocks. The requirements for the "recognition" of vine yards are dealt with, and a tabular statement is given of the distribution of the various species on the vine areas recognized up to 1926 in the different vine regions.

Vine region	Riesling	Sylvaner	Müller-Thurgau (Riesling + Sylvaner)	Rulander	Gutedel	Elbling	Müllerrebe	Frollinger	Portugieser
	a	a	a	a	a	a	a	a	a
Mosel, Ruhr and Saar.	5,062	—	—	—	—	5	—	—	—
Palatinate	30	164	—	—	—	—	—	—	—
Franconia	78	16	15	—	—	—	—	—	—
Baden	15	101	—	26	181	—	—	—	12
Württemberg	—	—	—	—	—	—	30	49	—
Hessen	26	218	—	—	—	—	—	—	—
The Rhine province	121	—	—	—	—	—	—	—	—
Total: 6149 a	5,332	499	15	26	181	5	30	49	12

TROPICAL AGRICULTURE

Analysis of Phosphatic Manures used on Tea Soils.

COOPER, H. R. and SEN GUTTA, P. B., *Quarterly Journal of the Indian Tea Association* (Scientific Dept.), Calcutta, 1927, pt I, pp 10-15. 3 tables.

These experiments were made for the purposes of defining the materials used in field experiments and commonly sold under trade names without further elucidation, and of determining the existence of any correlation between analysis figures and field results.

Phosphatic manuring produces changes in the soil in two directions :
(1) Increase in phosphoric acid available to plants ; (2) significant change in soil acidity

The following table gives some of the results recorded :—

	Relative Efficiency in field	lbs applied per acre		
		Total phosphoric acid	Phosphoric acid soluble in 2 % citric acid	Acidity reducing power = lbs of lime
Basic Slag	100	80	64.5	169
Super-	87	"	water soluble	nil, on contrary neutralizes 40 lbs lime
Bone Dust.	82	"	49.6	46
Algerian phosphate	85	"	28.6	88
Belgian phosphate	60	"	7.4	131
Plutophos	32	"	14.6	57

With basic slag the 2 % citric soluble percentage gives a good idea of its efficiency, but it cannot be said to be a satisfactory basis for judging the others.

The Algerian phosphate was found to contain a very small content of nitrogen which makes the field result open to doubt.

Plutophos provides twice as much citric soluble phosphoric acid as Belgian phosphate and yet is only half as efficient in the field, the efficiency of the Belgian phosphate being due to its relatively high acidity reducing power. Other fertilisers tested in the experiment such as "Radiophos", "Indophos" and "Singhbhum" phosphates showed very

ow efficiency in the field and were very low in citric soluble acid and in acidity reducing power.

Possibly these two tests together may enable one to pick out in the laboratory mineral phosphates unlikely to be valuable on acid soils. Otherwise field trials are essential.

The high position of the acid superphosphate is noticeable. Its action is actually to reduce the acidity of the complex mixtures of substances in the soil by its power of combining with and rendering insoluble the more soluble of the complex aluminium compounds responsible for the mineral acidity of Indian Tea soils.

When used in conjunction with lime its efficiency equals that of basic slag.

Belgian phosphate was found remarkably even in size, the particles coming practically all under the "Fine sand" category 0.2-0.04 mm. in diameter.

The fact that the less efficient phosphates such as Singhbhum, Indophos, etc. are very finely ground shows that fine grinding is not enough to render such insoluble materials efficient as quick acting manures.

Quantity of Irrigation Water used by native Farmers in the Residency of Soerabaja.

VINK, G J and HORST, W A with collaboration of de VRIES, E Watermetingen by padi gogo en polowidjo in de residentie Soerabaja, Oostmoesson 1923, 1924 en 1926 *Korte Mededeelingen van den Afdeling Landbouw*, No 4, Buitenzorg, 1927 (with a summary in English)

Experiment plots were made to ascertain how much water is used by the small cultivators in the cultivation of irrigated rice and irrigated corn and peanuts in the dry monsoon. In 1923 an average of 4560 cubic metres was used per hectare, besides the rain which supplied 3770 cubic metres. It seems that for rice irrigation water is available in sufficient quantity, if about 5000 cubic metres per hectare is delivered. Taking into account the loss of water in the ditches, the quantity in storage has to be approximately 9000 cubic metres per hectare. The rice crop takes about 5 months to ripen.

Peanuts interplanted with maize required per hectare at the Soemengko experiment 2850 cubic metres, at Koetoporrong 2745 cubic metres. Maize was harvested after 75 days, peanuts after 100 days.

The POJ 2725 Sugar-cane in Argentina.

CROSS W. E La caña POJ 2725. *Revista industrial y agricola de Tucumán*. Buenos Aires, 1927, v XVII, n. 9-10, p 213-227

The POJ 2725 cane obtained in Java by repeated hybridization for combining resistance to mosaic with a high yield of cane and high sugar

content was introduced in 1919 into the "Estación experimental agrícola" of Tucumán for comparative tests with the POJ 36 and POJ 213 canes which are not successful there and which, like the new hybrid, contain blood of POJ 100 (Chunnee Cheribon).

From the results obtained from 1919 to 1926 the writer concludes :—

(1) The POJ 2725 cane is highly resistant and almost immune to mosaic ; periodical inspections for removing the few plants attacked suffice for keeping the plantation healthy ;

(2) it gives high productions of cane (377.5 q. per ha.) and sugar , it ripens fairly early ;

(3) it does not undergo deterioration (inversion) during the first few days or even during the first few weeks after cutting, in striking contrast to the varieties commonly grown in the Province of Tucumán ;

(4) it contains less fibre than POJ 36 and 213 ;

(5) stripping and transport can be done at a minimum cost.

Cultivation of Sugar-Cane in Peru.

ROSENFELD, A H El cultivo de la caña de azúcar en Peru *Revista industrial y agrícola de Tucumán* Buenos Aires, 1927, v XVII, n 7-8, p. 171-180

At the beginning of 1927 the "Liga agraria" of Peru requested the Tropical Plant Research Foundation to make a complete enquiry into the cultivation of sugar-cane in Peru ; the Foundation agreed, and the writer, a special expert of the American Sugar Cane League was placed in charge of the enquiry and at once went to Peru to make the necessary investigations.

The cultivation of sugar-cane in Peru is restricted to the valleys of the short rivers which from the summit of the Andes flow into the Pacific. There are 14 of these valleys two of which, the Chicama and Santa Catalina valleys in the northern division of the Libertad, are so close together as to form a single basin although irrigated by the waters of two different rivers. Though the whole Peruvian sugar-cane zone lies in the tropics, its climate is sub-tropical owing to the influence of the Humboldt cold current. This does not constitute a disadvantage, seeing that on the other hand, it is always possible to regulate precisely the distribution of the water and to allow the cane to ripen artificially by suspending, at a suitable moment, the distribution of the water.

Most of the irrigation works of the Peruvian "valles" were constructed by the Incas or their predecessors and are distinguished, in comparison with similar systems of distribution of water, by simplicity, efficiency and economy.

The land of the valleys is alluvial, with a subsoil of sand and gravel (and hence very permeable), and is generally easily cultivated. All grades of soil composition and compactness from clayey to sandy conditions are present.

There exists in Peru an area of desert lands at least ten times as ex-

tensive as that at present under cultivation. These lands could however be transformed by irrigation into very fertile arable lands, as is proved by the abundant vegetation which appears and transforms them into rich pasture whenever moistened, as occasionally happens, by some slight rain or one of the mists peculiar to the whole coastal zone during the summer season. Large irrigation works are in course of construction for reclaiming these lands.

Water abounds in summer and is scarce in winter. To obtain a supplementary provision for utilization in times of scarcity wells have been dug and are fed by filtering tunnels. The high cost of this water, which has to be raised by pumps, is fully repaid by the increased crop. Owing to the fortunate coincidence of abundance of water and the maximum temperature, the growth of sugar cane is extraordinarily rapid. On the average the irrigated cane fields receive 430,000 litres of water per hectare a week.

In all the valley, except the Tambo valley (the most southern), the old Bourbon or Otaheite cane, known all over Peru by the name "caña criolla" is exclusively grown: there are only small experimental plantations, generally mixed, of other varieties introduced into the country many years ago. In the Tambo valley the "Rayada" and "Purpura de Louisiana" ("Cheribon") canes are principally grown: on one farm "Trinidad 34", an early variety, rich in sugar, with little fibre is grown. "There is probably no other country in the world in which the preparation of the ground for sugar-cane has reached such a high degree of perfection as in Peru". This includes removal of old roots and all other debris; three ploughings each followed by harrowing and sometimes by ploughing with a disc plough, the furrows 25-40 cm. deep at intervals of 1 m. 50.

For planting generally only cuttings 45 to 60 cm. long are used.

Manuring is done, ordinarily three months after planting, with 10 to 15 q. per hectare of island guano, containing 8 to 9 % of phosphoric acid and about 2 % of potash. In the Chicama valley one quintal per hectare of nitrate of soda is often applied, dissolved in the irrigation water. Generally harvesting is done 20-22 months after planting; irrigation is suspended three or four months earlier. Except the plantations in the Tambo valley and those in which cuttings of cane intended for planting are made every year (only one-tenth of the cane plantation is renewed annually), almost all the fields are set fire to before cutting (to burn the leaves).

The canes of the successive years are treated like those of the first year. A practice characteristically Peruvian is the "desbroza", that is to say the heaping up and burning of all the refuse. About three weeks later the furrows are levelled out; two months later manuring is done (immediately after the levelling if nitrate of soda is used); the cultural operations consist in cross ploughing of the spaces between the rows. 6 to 11

successive cuttings are made at intervals of 16 to 20 months; the sugar plantation lasts from 10 to 18 years.

Irrigated cane plantation land is sold at 1000-2300 pesos per hectare (1 peso = approx. 2/ at par). The yield varies from 90 to 200 tons of cane per hectare. The writer notes the extensive use of good machinery worked by light tractors which sometimes burn alcohol produced on the farm itself.

The only really injurious pest is *Diatraea saccharalis*. This is not found in the Tambo valley, the only area where burning of the cane plants is not practised. This burning undoubtedly destroys many of the natural enemies of the *Diatraea*. The absence of fungoid disease is remarkable.

Researches on the physiological Function of Latex.

BOBILIOFF Dr A, Onderzoekingen over de physiologische beteekenis van melksap der planten. *Archief voor de Rubbercultuur in Nederlandsch-Indië*, vol II, n^o 6, p 235-247. Buitenzorg, 1927 (With an English translation summary)

From the fact that the seedling takes all the nutritive substances from the cotyledons but leaves the contents of the latex vessels entirely intact, it may be deduced that these contents have no nutritive value for the plant.

In the species *Kopsia flavida* we see latex vessels principally in the young shoots. In the stem the latex is present in a smaller quantity. This makes it, according to BOBILIOFF, improbable that the latex plays any important physiological role.

Though certain dyes can be absorbed by the latex, there is no indication that the latex-vessels have any important function in transporting the dyes. The latex-vessels only take up some of these substances from the wood-vessels in places where diffusion is easy.

In some of the lactiferous plants the latex flows slowly, in others quickly. *Hevea* belongs to the former group.

Investigation on the Occurrence of Fissures in the Interior of the *Hevea*-bark.

BOBILIOFF Dr. W., Onderzoekover het voorkomen van inwendige spleeten in de bast van *Hevea*. *Archief voor de Rubbercultuur in Nederlandsch-Indië* vol 11, n^o 7, p 251-261. Buitenzorg, 1927. (With an English summary)

When the *Hevea* is tapped, sometimes fissures appear, which extend for some distance in the bark.

AGRICULTURAL ENGINEERING

Electro-Farming in Scotland.

MATTHEWS, R. B., *Scottish Journal of Agriculture*, Edinburgh, 1927, Vol. X, No. 3, pp. 271-279.

The writer states that 60 % of the total cost of farm produce is chargeable to power and labour, hence a more efficient use of power is necessary.

Finance. — Where possible a farmer will find a public supply the most economical. Otherwise it should be possible to instal a small economic generating plant for farms of over 150 acres. In Scotland, moreover, waterfalls can often be harnessed and made to provide electric power.

Lighting — On his own farm the writer has found that the use of electric light in the cow byres has more than paid for itself merely by the saving of milk previously spilled owing to faulty lighting conditions. Poultry too can be kept in better health and egg-laying condition by feeding in electric light during the winter. It has been found that electrically lighted and heated bees produce considerably more honey per hive and are freer from disease than those not so treated.

Dairy. — A small electric motor serves for most purposes in the dairy, for separating, churning, refrigerating, milk bottling and for driving milking machines.

Electric motors — These have certain advantages over oil or gas engines in driving barn machinery, including a longer life and the necessity for less heavy foundation. They have moreover a large overload capacity and need little attention. A 5 h.p. engine is the most suitable for driving the machines which are usually found on the farm. They can be bought mounted on wheels, handles or wooden frames and taken to the machines which are required to be driven.

Hay-making — Scottish meteorological conditions do not entirely favour natural hay-making and since 1920 satisfactory methods have been gradually evolved for curing hay artificially by currents of air from electrically driven fans. The Institute of Agricultural Engineering and many public and private bodies have tried methods of curing which differ in temperatures used etc. Methods so evolved and employed largely obviate weather risks.

Ploughing. — Hitherto greater progress in electric ploughing has been made in France, Germany and Italy than in Great Britain, but the writer and others have made successful experiments on their own farms and the financial side of the question is being very closely examined by the "Electricity in Agriculture" Committee of the Institution of Electrical Engineers. Their findings show that under certain conditions electric

ploughing even at its present stage can compete with success with all other methods.

The following table gives actual results obtained with electric ploughing and from it the cost of the necessary current in any district can be calculated.

Depth of Furrow in inches	Consumption in Units per acre
0	12-18
6-8.75	16-22
8.75-10	18-24
12-12.5	22-26
10-12 plus 6 subsoiling	36-45

The Power Supply undertakings in Fife and Kilmarnock are doing much to extend their power lines in the surrounding districts. In many of the Fife farms every detail in threshing, including bestowal of straw and chaff after threshing, is done electro-mechanically.

Electro-farming in Scotland is definitely on the increase.

A Combined Seed Disinfectant and Drill.

Ein Saatgutbeizapparat zum Aufbau auf die Säemaschine *Die Landmaschine*, Berlin, 1927, Jg 7, Nr 21, p 340-341.

This is a very simple apparatus which offers many advantages. The disinfecting apparatus is placed above the seed container and should be filled before the machine is driven out into the open field. During transit the seed is mixed with the disinfectant by a mechanism connected with the wheels. On the field a bolt is pulled and the seeds now disinfected fall into the lower container. The upper container is at once refilled with seed and disinfectant, allowing always at least three minutes for the process of mixing.

The makers are F. ZIMMERMANN & Co. Ltd., Halle on Saale. A considerable saving of labour is effected by using this apparatus, as instead of the multifarious processes previously required for seed disinfection (disinfection of seed in store, bagging and preparation for later sowing) only a single one is now necessary, viz., the placing of seed and disinfectant in the machine. Another advantage is that the mixture of the seeds with the disinfectant is done automatically and hence is absolutely

reliable. As only exactly the right quantity necessary for sowing is disinfected at one time, no shortage or loss of disinfected seed is possible.

The Effect of Growth upon the Capacity of Drainage Ditches.

RAMSER, C. E. *Agricultural Engineering*, Saint Joseph, Michigan 1927, Vol. 8, No. 7, pp. 177-180, illus.

An article based on actual tests of the capacity of cleared and un-cleared water channels in the States of Missouri, Mississippi, Arkansas and Illinois.

In many cases one and the same channel was tested before and after clearing.

The measurements consisted of obtaining the discharge, the average cross-sectional area and slope of the water surface of a course of channel and computing therefrom the roughness coefficient by KUTTER's formula.

Particular examples with illustrations are given and the general conclusions reached are that drainage ditches should be cleared out yearly in order to maintain a high level of efficiency. Where vegetation, such as willows, etc., is allowed to remain in a ditch over a period of years, the cross section of the ditch is greatly reduced in size by the accumulation of silt, which often necessitates the redredging of the channel. In many cases examined the water capacity was doubled by clearing ditches constructed only a year before.

In many cases owners of land are too inclined to undertake widening of the drain or cutting new ones, when all that is required is periodic clearing

ANIMAL HUSBANDRY

Advantage of Railway Transport for Animals sent to Fattening Centres in Brazil.

O problema da pecuaria nacional debatido na Sociedade Rural. *O Criador Paulista* São Paulo 1927, v XXII, n 5, p 98-99

A communication from the Armour Company of Brazil to the "Sociedade Rural Brasileira" shows by means of figures based on experience the economic advantage of moving cattle to the fattening centres by railway instead of, as is usual, in droves. The fattening centre of Matto Grosso is Campo Grande, to which 150,000 head of cattle were sent from Barretos in the State of São Paulo in 1925; another 50,000 were sent from Barretos to other fattening centres. While transport on foot from Barretos to Campo Grande costs 45 *milreis* per head, the cost by railway is 23.6 *milreis*. Animals which have made the long journey on foot to the fattening centre have to be kept grazing for 6 months longer and their final weight is 1 *arroba* (32 4 lbs.) less when compared with animals transported by rail.

As the grazing (including salt, manual labour, taxes and other expenses) costs 6 *milreis* per head per month and the value of 1 *arroba* of live weight is 16 *milreis*, transport by railway gives a total saving on the fattened animal of $21.4 + 36 + 16 = 73.4$ *milreis*.

The pasture lands now in use if improved by sowing good forage plants and grazed by animals transported by railway could fatten double the present number of animals. Moreover, if railway transport were employed, there would be much less danger of spreading contagious diseases.

Effects of Acute and Chronic Inanition on the Functions of the Testicle and the Ovary.

MARTINO G. Effetti dell'inanizione acuta e cronica sulle funzioni del testicolo e dell'ovaia. *Archivio di Scienze Biologiche*, Naples, 1927 v IX, n 3-4, p 339-353, 7 fig., bibliography

After a bibliographical account of results given by previous researches, the author states that the purpose of his experiments is to discover the effects of acute and chronic inanition on the activity of the testicle and the ovary by paying quite special attention to the endocrinal function of these organs.

He chose as subjects of experiment the cock and the hen and subjected these animals, in some experiments, to complete fasting (giving them only water), in others to under-feeding. He selected adult animals, normal, well nourished and with a well controlled and well marked activity of the sexual glands. Before being subjected to the experiments the cocks and hens were carefully studied with respect to their principal and secondary sexual characters.

On the animals so chosen 3 series of experiments were carried out :—
1. *complete fasting*: the animals were supplied with water only; this fasting lasted for 13-18 days for the cocks and 20-24 days for the hens, that is to say in both cases up to the commencement of LUCIANI's phase of pathological inanition.

2. *Under-feeding*: wheat + maize in quantity insufficient to maintain body weight and so as to cause a total loss of weight equal to that produced by the absolute fast, but a slow loss, requiring about 2 months to effect: at this point the daily feeding was regulated so as to prevent any regaining of the lost weight but also to prevent ulterior losses, this state being maintained for about 2 months.

3. *Prolonged fast followed by under-feeding*: as soon as a loss of weight equal to those of the 2 previous experiments was reached, the daily feeding was regulated day by day so as to oblige the animal to remain in that condition during a given period of time.

During all these experiments and during re-alimentation up to complete return to the normal estate, the functions and sexual characters of the animal were studied.

The various experiments carried out and the results observed permit of the following conclusions :—

(1) Complete fasting, continued up to the commencement of the pathological phase (according to LUCIANI) causes evident functional weakenings of the testicles in the cock; these weakenings are shown not only by the complete (but temporary) suspension of desire and sexual activity but also by the regression of secondary sexual characters; regression which comes about in the same way, if not also in the same degree as that produced consequent on castration. This regression is not appreciable during the period of absolute fasting, but is manifested and effected in the subsequent period of realimentation, that is to say at the same time as the general condition of nutrition of the animal is being reestablished and the body weight increases again towards the normal.

The re-integration of the general condition of nutrition is therefore always produced after the weight returns to the normal.

(2) Under-feeding, continued up to the limit corresponding to that indicated above for complete fasting results in the same functional weakenings: but in this case, the facts of regression may be more marked and, as is made possible by the longer duration of the period of denutrition, they begin and are accomplished during the phase of chronic inanition itself, disappearing afterwards gradually during the subsequent realimentation, with in this case also a complete return to normal conditions.

(3) As soon as the maximum possible effect has been reached by the

reduction of food, if the administration of nourishment is regulated so as to prevent subsequent variations in the weight, whether plus or minus, the phenomena of sexual deficiency previously obtained can be kept stationary for a long time; but even after two months continuance, complete reintegration may be arrived at by the return to suitable and sufficient feeding.

(4) In the experimental conditions adopted by the writer, the modifications of sexual activity and of the secondary sexual characters have always shown themselves susceptible of complete reintegration.

(5) As a general rule, the disturbance of the germinative function of the testicle has appeared sooner and lasted longer than that of its endocrinal function.

(6) It has also been substantially possible to observe for the ovary, in the hen, under similar experimental conditions similar functional disturbances (temporary suspension of ovulation, reduction of the volume of the comb), these also being susceptible of complete reintegration.

It has however been observed that, in the hen, the reappearance of ovulation is produced before the total recovery of the comb, that is to say that, in the female, in distinction from what is observed in the male, the germinative function seems to be reintegrated more rapidly than the endocrinal function.

The Computed as Compared with the Directly Observed Fasting Katabolism of Cattle as a Measure of the Maintenance of Energy.

FORBES, E. B., KRISS, M. and BRAMAN, W. W. (Institute of Animal Nutrition, Pennsylvania State College). *Journal of Agricultural Research*, Washington, D. C., 1927, Vol. 34, No. 2, pp. 167-179, 2 tables, bibliography.

A comparison is made of: (1) 62 determinations of the maintenance requirement of energy for cattle, obtained by the heat-increment method, in which the heat production at a state of zero food intake is computed from the observed heat production and food intake at two planes of nutrition, and (2) 18 determinations as to the directly observed heat production during fast.

The computed determinations varied between 662 and 1643 Calories per square metre of body surface, the coefficient of variation being 17.93 ± 1.12 per cent in terms of square metres of body surface and 19.52 ± 1.23 per cent in terms of the live weight.

The direct determinations varied between 1313 and 1537 Calories per square metre of body surface, the coefficient of variation being $4.51 \pm$

0.51 per cent in terms of square metres of body surface and 6.65 ± 0.76 per cent in terms of the live weight.

The fact that the maintenance requirements as computed from supermaintenance rations are always lower than the directly determined values indicates that the relation between the heat production and the food intake would not be represented graphically by a straight line and that the utilization of food energy for maintenance is at a higher rate of efficiency than is its utilization for body increase.

On account of the narrower range of variation of the direct determination it has been adopted as the standard measure of the maintenance requirement of energy in place of the heat increment method formerly used, and the standardization of this method is in progress.

Chemical Method of Castration.

RICCIARDELLI V L'applicazione del metodo chimico nella castrazione del cavallo. *Giornale di Medicina Veterinaria*, Turin, 1927, y. LXXXVI, n. 30, p. 417-419

The writer has proposed to replace surgical or mechanical castration by the injection of "Evrol" which he has described in his pamphlet *Di un nuovo metodo di castrazione dei maschi mediante iniezioni endo-funicolari*. Publisher G. Bottoni, Portomaggiore (Ferrara).

In the article under review he gives an account of the application of the method to a stallion and to colts

The Influence of the Age of the Cow on the Yield and Quality of the Milk (1).

DRAKELEY, T. J., Ph D., M Sc., F I.C., and Margaret K. WHITE, M.Sc., *Journal of Agricultural Science*, London, 1927, Vol. XVII, part 3, pp. 420-427, 11 tabs.

In a previous article (1) the writers examined the effect of the stage of lactation and the breed of the cow on the yield and quality of milk.

The results of MACKINTOSH and of TOCHER were based largely on the analyses of milks of Ayrshire cows only, those of the writers on those

(1) See also abstract on "The influence of the stage of lactation and the breed of the cow on the yield and quality of the milk", *International Review of Agriculture*, year XVIII (new series). No. 4, p. 455.

of 9 different breeds obtained at the shows held by the British Dairy Farmers' Association during the past 48 years.

These cows are above the average, but it is considered that the position of the curve showing the relationship between the various factors and the age would be the same as regards the age axis as that obtained in normal practice.

It was found that age had no separate effect on the evening as against the morning milk.

The average number of days in milk differed for each breed, the limits being 41 days for Ayrshire and 108 for Jersey cows.

Results. — Tables of results are given for the following breeds :— Dairy Shorthorns, Red Polls, Lincoln Reds, British Friesians, Ayrshires, Jerseys, Guernseys, Kerrys, Dexters.

Yield. — This increases rapidly for all breeds, reaches a maximum and gradually declines, the age and length of duration of the maximum varying slightly for different breeds. Thus Shorthorns attain their maximum yield in their 8th year and keep it for another year before showing a decline, while Jerseys attain it in the 7th year, the decline starting in the 9th.

Fat. — The percentage at first increases and then decreases : for all breeds the quality of milk of very young cows is richer than that of cows over 6 or 7. The highest fat content is attained in the 4th and 5th years by Shorthorns, whereas Guernseys reach their maximum at three.

The actual weight of fat yielded rises to a maximum between the 5th and 8th year. The percentage of fat in the milk solids shows little variation.

Solids-not-Fat. — The percentage decreases continuously with age, though sometimes almost imperceptibly until after the 3rd year. The actual weights increase until about the 8th year.

It is proposed in a future communication to deduce for each breed the joint relationship between the variable factors, age, period of lactation, yield and quality of milk.

Relation between the Udder Capacity of Dairy cows and Milk yield.

SWERT W. W. Relation of conformation and anatomy of the dairy cow to her milk and butterfat producing capacity. Udder capacity and milk secretion. *Journal of Dairy Science*, Vol. X, No 1, p 1 to 14, 4 fig, 2 plates, bibliog Baltimore, 1927.

The author gives some account of the results of previous investigations and states the conclusions of the enquiry undertaken to determine the relation existing between the conformation and anatomy of the dairy cow and her milk and butterfat producing capacity, with special attention to the mammary gland.

In order to measure the udder capacity, *i. e.*, the space available in the

secretory system, formalin was injected into the teats, by means of a teat tube, and the quantity retained in the secretory system was measured.

The results obtained by the author allow the following conclusions to be reached :

1. Milk secretion is to a large extent a continuous process.
2. A large part of the milk drawn at each milking is stored in the gland before the milking begins.
3. The internal capacity of the udder of a cow during the lactation period is much superior to the volume of milk secreted.
4. The yielding of the milk does not depend entirely either on a nervous or mechanical stimulus, or on an internal muscular contraction, since milking may be effected after disappearance of all these bodily connections. In one case, *post-mortem* milking readily yielded 85 % of the quantity of milk produced in identical conditions before slaughtering ; in another case, the milking only produced 49 %, but an incision made in the udder resulted in a flow of milk which proves that in this case the milking itself was incomplete. In any case, a relatively large proportion of the average milk yield is found to be stored in the udder at the time of death. The reason for the greater difficulty experienced in *post-mortem* milking is not fully understood, but it would seem that muscular contraction (*rigor mortis*) counteracts the milking process.
5. The most striking peculiarity of milk drawn after death is its low content in butterfat ; this phenomenon may be explained by the fact that the fat globules tend to be retained in the lactiferous tubes, as a consequence of the lowering of temperature, after death, both of the gland and of the milk contained in it.

Composition of Milk towards the End of Lactation.

NOTTBOHM, F E, Unterbrechung der Melkzeiten und Zusammensetzung der Milch *Zeitschrift für Untersuchung der Lebensmittel*, Berlin, 1927, b 53, Nr 5, S 342-353

During the last part of the lactation period the milk undergoes changes especially in regard to its content in fats and albuminoids. Thus for one and the same cow the writer found :

Percentage	2 months before drying off	1 month before drying off	1 day before drying off	the first day of drying off	the 2nd day of drying off
Fat	6.02	6.10	6.81	6.94	9.23
Total Nitrogen.	4.71	1.79	5.38	5.52	6.62
Casein	3.83	3.82	4.21	4.27	5.35
Substances dissolved in the whey (albumin, globulin, etc.)	0.88	0.97	1.17	1.25	1.27
Lactose	4.57	4.04	4.34	4.14	3.83
Ash	0.73	0.73	0.72	0.77	0.90
Solids not fat	10.14	10.23	10.49	10.51	11.38
Chlorine (gm. per litre).	0.507	0.348	0.364	0.554	0.752

The above are only a few of the numerous exact results of analysis given by the writer.

Two phases can be distinguished in the drying-off period. In the first there is no appearance of leucocytes and only slight changes are noticeable in the composition of the milk; for example there is no change in the casein: total nitrogen ratio. Some cows dry off during this phase.

The second phase is accompanied by important changes in the normal composition of the milk. The lactose decreases to about 1 gm. per litre while the chlorine rises to about 2 gm. per litre. There is a change in the albuminoid alkali ratio, and in addition the liquid secreted undergoes important changes of colour, taste and reaction.

Hence the writer is of the opinion that the milk produced by a cow which is being dried off, *i. e.*, when the customary two milkings a day have been suspended, ought not be sold for consumption in its natural state, so greatly does it differ from normal milk.

Critical Tests of Tetrachlorethylene as an Anthelmintic for Foxes.

HANSON, K. B. *Journal of Agricultural Research*, Washington, D. C., 1927, Vol. 34, No. 2, pp. 129-136, 4 tables, bibliography.

Tetrachlorethylene is as effective as carbon tetrachloride in the removal of hookworms from foxes, and apparently more so in the removal of ascarids. The indicated dose is 0.2 c.c. per kilo of live weight, or 1 c.c. per 11 pounds, making about 1 c.c. the proper dose for the average-sized adult fox.

In contrast with carbon tetrachloride, in cases when the containing capsules accidentally break, the administration of tetrachlorethylene apparently is not attended with the danger of inhalation intoxication.

AGRICULTURAL INDUSTRIES

Wine and the Wine Lands of the World.

FRANK HEDGES BUTLER, T. Fisher Unwin, London, 1927, 1 vol. pp. 271 , 45 plates.

An interesting book very luxuriously got up and printed. The author, a great traveller, is mostly interested in the picturesque side of the question. The text, which is full of first hand information, is illustrated by admirable photographs and makes very attractive reading.

The book concludes with a list of the characteristics of the different vintages since 1900 for the best known brands and the cognac-brandies.

Analysis of Cider and Wine in Ultra violet Light.

REICH V und HATTINGER M, Untersuchung von Obst- und Traubenwein im ultravioletten Licht Agrikulturchemisches Laboratorium der Lehranstalt Klosterneuburg, *Weinbau und Kellerwirtschaft*, Freiburg i. Br., 1927. 6 Jg Nr 14, p 146.

Following on REICH's observation that wine is fluorescent in ultra-violet light and cider not, the writers were anxious to discover the cause of this phenomenon. They used for their trials different media, such as ether, chloroform, benzol, etc., and they were able to make the observation that fluorescence passes partly into the medium, e. g. that adulterations of wine with cider shows markedly perceptible gradations from white to violet, i. e. the more the wine is adulterated with cider, the more the colour inclines towards violet

With this method it was also possible to determine the fluorescence of red wine which is not susceptible of direct observation under the quartz lamp, since no colouring matter passes into the ether film, and hence no disturbance of the fluorescence takes place

As to the cause of the observed fluorescence, up to the present time only mere surmise exist, but it is believed that further trials carried out with vinegar and alcohol will throw light on this question.

The Manufacture of natural Fruit Juice Cordials.

Die Herstellung natürlicher Fruchtsaft Limonaden. *Land and Frau*, Berlin, 1927, II. Jg., Nr. 3, p. 41.

In the ordinary methods of distillation or pasteurisation of fruit juices, which have been extracted from fruits by pressure, not only are the

fermentation and putrefaction agents killed, but also undoubtedly valuable substances, especially vitamins, are destroyed. There is however a "cold method", which enables the fruit juice to be kept sufficiently long and does not involve the loss of any valuable substances.

The method consists in the use of a double working pump. The juice is first deprived of all air by the forward movement of the piston, and on the return stroke, being thus freed from air, it is forced in fine jets into a compartment which is at the same time filled with CO_2 . Here the impregnation of the fruit juice with CO_2 is so complete that the CO_2 saturated juice can no longer take up the air from which it has been freed. The juice then contains only pure CO_2 , which even for a long period of storage checks the appearance of all ferments and putrefaction.

Unfortunately the necessary apparatus, manufactured by the engineering firm of Boldt and Vogel at Hamburg is so expensive that its installation can be considered only for factories or establishments for the co-operative production of fruit juice cordials.

Some Variations of the Heat Method for Sterilizing Milking Machines.

BURGWALD, L. H. *Journal of Agricultural Research*, Washington, D. C., 1927, Vol. 34, No. 1, pp. 27-33

The method of sterilizing milking machines by the use of heat has been advocated only during the last few years. The chief criticism of this method has been that it is too injurious to the rubber parts of the machines. The present investigations were undertaken to find a method that would give as good results bacteriologically as the heat method but would allow a longer life to the rubber parts.

In the heat method referred to the unit, consisting of teat cups, claw and tubing, after being washed is placed in hot water at a temperature of 160° to 165° F., and allowed to remain there between milkings, the water cooling gradually.

The experiments indicate that sterilizing the units at 160 - 167° F. for 20 to 35 minutes and placing them in a weak chlorine solution (about 1 : 20,000) or hanging them in a refrigerator or cold place (below 50°F) protected from dust or contamination, will give excellent bacterial results and that the life of the rubber parts will be materially longer than when the units are allowed to remain in hot water between milkings.

Fleischmann's Formula for the Determination of Dry Matter Content in Milk corroborated by a Mathematical Method.

NIKLAS H. and MILLER, M. Die Fleischmannsche Formel zur Bestimmung der Trockensubstanz der Milch, auf mathematischem Wege besta-

tigt *Fortschritte der Landwirtschaft*, Wien und Berlin 1927, 2 Jg. Heft 10, S 318-319

The formula which FLEISCHMANN laid down in 1885 for the determination of the dry matter content of milk is :

$$t = 1.2 f + 2.665 \frac{100s - 100}{s}$$

where t represents the percentage of dry matter, f the fat content and s the specific weight of milk. In this formula FLEISCHMANN assumed that the specific weight of the fat-free dry matter, as well as of the butter fat, is nearly constant. There are however fluctuations in these values which, although not considerable, affect the above formula so that the two constant values (1.2 and 2.665) also fluctuate. The authors undertook to ascertain these latter fluctuations with the object of possibly substituting an improved formula for FLEISCHMANN'S.

The authors employed in their investigations the method of the smallest squares, which they had already utilized to verify MITSCHERLICH'S formulae. They ascertained that these formulae were not sufficiently established.

The 47 observations, with which FLEISCHMANN confirms the accuracy of his method, were tested in the same way, and it was established that value 1.2 does not change markedly, whereas the value 2.665 should be replaced by 2.690.

The authors conclude however that, generally speaking, the deviations ascertained by the method of the smallest squares lie within the permissible limits of error, so that the FLEISCHMANN formula is to be considered as completely valid.

Systematic Researches on Frost's Method (small cultures on object glasses) for Counting Living Bacteria in Milk.

CLARENBURG A (Docteur en médecine vétérinaire de l'Ecole vétérinaire d'Utrecht). Reviewed by Prof. C F van OIJEN. *Le Lait*, Lyons, 1927, a. 7, t. VII, n° 64, p. 321-336, 14 fig.

The measure of the number of living bacteria in milk is evidently of exceptional value for obtaining a rigidly exact estimate of the state of cleanliness and of preservation of this product. The writer reviews the methods hitherto proposed (methods of BREED, OLAV-SKAR, KOCH-PETRI) and concludes that there has been hitherto no exact and rapid method which was satisfactory for the ordinary practice of hygienic milk testing.

In this enquiry his intention was to subject to severe tests the results reached by the method recommended by W. D. FROST, Professor of Bacteriology at the University of Wisconsin (U. S. A.), a combination of

BREED's direct method of examination and of the KOCH-PETRI indirect method.

With this object he has compared the results of FROST's method with the results given on gelose by PETRI's dishes when left in the stove for 5 days at 22°C

The following is the description of FROST's method :—

(1) The sample is first shaken so as to disperse the fatty matter evenly.

(2) With a sterile pipette 10 cubic cm. of milk is introduced into a test-tube closed with a sterilized stopper.

(3) The tube is shaken with the object of dispersing any bacterial agglomerations.

(4) Two squares with sides of 2 cm. are traced on an object glass ; this glass after sterilization in the flame is placed on a water bath at about 45°C.

(5) A sterile pipette of 0.1 cubic cm. is filled with milk.

(6) Half of that quantity is introduced on each of the two traced squares.

(7) To each drop of milk thus obtained is added the same quantity of gelose previously melted, then cooled to 40-45°C

(8) The milk and gelose are intimately mixed by means of a fired platinum spatula, and the mixture is spread over the entire surface of the square

(9) The preparation is numbered and placed under a bell-glass on an absolutely horizontal plane, the gelose again becomes solidified.

(10) The object-glass is placed on the oven in a moist chamber.

(11) The preparation is dried at 90°C. for 2 or 3 minutes.

(12) The colonies are stained with thionine blue after previous immersion of the preparations in an alcoholic solution of acetic acid.

(13) The colonies are counted under the microscope.

The writer has made some improvements in FROST's original method : — as regards N^o 4, he traces rectangles 2 cm. wide by 2.5 cm. long ; as the area of the rectangle is thus 5 square cm., each square mm. takes 0.0001 cubic cm. of milk, which facilitates counting the bacteria per cubic cm.

As regards N^o 10, the writer considers that the most favourable temperature is 27°C. for 20 to 24 hours

In conclusion it may be said that —

(1) FROST's method on small cultures on plates is a simple, convenient, rapid method for determining the number of bacteria per cubic cm. of milk.

(2) By this method only a small quantity of the culture medium, is required, and a very limited number of instruments and a stove of small size.

(3) It enables exact results to be obtained the day after that of delivery of the sample, while the old methods required 2 to 7 days.

(4) A temperature of 27°C. and a period of from 20 to 24 h. in the stove should be employed

(5) In the event of any adventitious production of bacteria in the milk, the samples should previously be diluted with either a $\frac{1}{10}$ or $\frac{1}{100}$ solution of peptone + chloride of sodium.

Extraction of Oil by a centrifugal Method.

Les nouveaux procédés d'huilerie. *La Revue oléicole*, Paris, 1927, a. 21 (n. s.) No. 249, p. 55-57.

The method here described which has been patented by the California Packing Corporation consists in : cleaning of the olives by means of a current of air and subsequent washing ; removal of the kernels in a centrifugator of the Cyclone type ; treatment of the pulp in separators ; clearing or purifying by the centrifugal method and filtration of the oil which, as there is no admixture with the oil from the seeds, is of superior quality

The water separated from the pulp and from the oil in the separators contains a certain quantity of oil. It is heated and treated with the required quantity of acid which breaks up the emulsion and makes possible the separation of the oil, a small quantity being thus yielded. This is of second quality.

Baskets for Oil Mills.

BONNET, J. Les scourtins en huilerie *La Revue oléicole*, Paris, 1927, a. 21 (n. s.), n. 250, p. 71-75.

Numerous experiments carried out by the author in 1924 and 1925 show that baskets made of alfa grass give, as compared with those of coco-nut fibre, olive residues containing less oil and are therefore more economical (with an average of 12 kg of additional oil for each quintal of residues). On the other hand, coco-nut fibre baskets are more resistant to strong pressure and, if new, double knotted and with small hems, they allow the oil to escape as satisfactorily as the alfa baskets. If coco-nut fibre baskets, after use, are put for half an hour in boiling water and afterwards given repeated washings with fresh water, they lose the defect of retaining the oil. It is sufficient to give this treatment once a week

SYLVICULTURE

Forestry in British Honduras in 1925-1926.

OLIPHANT J. N. Conservator of Forests, HUMMEL H. C. Manager and HEYDER H. M. Assistant Conservator of Forests *British Honduras Annual Report of the Forest Trust for the year ended 31 March, 1926 Belize 1926*

This report deals with the work of the fourth year's working of the Forest Department of British Honduras.

In the course of the year the exploration of unknown forest regions was continued and the collection of topographical data embodied in district maps

Three species of trees hitherto unknown in the Colony were discovered as well as some types of forest which had never been thoroughly investigated or described.

Progress was made with silvicultural work, although carried out on a modest scale, in the 5 State forest districts of the Colony. In the sixth district the Belize Estate and Produce Co and the Chiclé Development Co execute forest work and exploitation very effectively.

The work of improvement in the State forests of Silk Grass is now well organized and the weekly outturn is from 3,000 to 4,000 improved seedling plants of Mahogany (*Swietenia Mahagoni* Jacq and *S. macrophylla* King)

The experiments made during the year have given valuable results as regards the degree of light necessary for the growth of seedling mahogany plants. If these plants are deprived of over-head cover they are devastated by insects: if the leafy canopy is too dense they do not develop; the best results are obtained with irregularly interrupted cover.

The planting of *Cedrela odorata* L. is well developed, but the plants have a tendency to excessive branching, perhaps in consequence of too intensive cleaning. The natural regeneration of "Polak" (Polak = Balsa woods = *Ochroma* sp., *Belotia* sp., *Schizolobium* sp., *Hibiscus* sp.) under control in a field where in the previous year wheat was grown, is very satisfactory. In the State forests of Sibun Staun Creek and Middlesex, besides the special attention paid to the improvement of the forests and young plants of mahogany, "Salmwood" (?), "Yemeri" (?), Honduras Cypress (*Podocarpus coriacea* Rich.), climber cutting was also continued over an area of 335 acres on behalf of the mahogany trees.

At Middlesex experimental plots were started on 5 acres of land, previously under bananas and abandoned, for investigating the mode of growth

in "Balsa woods" with the ultimate object of using these species as shade trees for the more highly valued species (Mahogany, etc.). In the Columbia License Area forest work consisted in works of improvement for mahogany trees and young mahogany plants; in the State Forest of "Belize Pine" fire-protection and shortage of manual labour hindered works of improvement in the area stocked with mahogany and sapota (*Sapota achras* Mill.).

The possibility of establishing forests of conifers with short rotations as an intermediate stage in the reconstitution of more valuable hard-wood forests is the subject of continued research in the State forests of Silk Grass and Middlesex.

Considerable progress was made with the determination and nomenclature of local forest species and a list was compiled, giving the local and equivalent scientific names of the species identified.

Progress was also made in the study of the botanical and ecological characteristics of *Sapota achras* and other Sapotaceae producing "chicle gum", and in the experimental estate of the Chicle Development Co at Honey Camp improved methods for the extraction of sapota latex were tested.

Hunmel reports that in forests belonging to the Belize and Produce Co a total of 30,309 trees, small trees and plants, principally mahogany and sapota, were treated in connection with the work of forest improvement.

Dealing with forest work in the Tower East holding of the Chicle Development Co., which has an area of 11,056 acres of which about 6,000 are stocked with sapota, HUYDER states that over an area of 4,400 acres the trees and young plants of this species were improved (either by girdling and felling other trees which interfered with their growth, or by cutting clunbers, etc.) During these operations 7,745 mahogany plants were found, which also received improvement care.

By means of measurement and research the rate of growth of young plants of sapota and the best method of assisting its natural regeneration were investigated.

A completely furnished meteorological station has been established at Honey Camp.

The Forests of Cyprus.

UNWIN, A. H. Principal Forest Officer *A short Description of the Forests of Cyprus*, Nicosia, 1927, pp. 6-23

The principal types of forest on the northern mountains of Cyprus are composed of:—

- (1) pure high forest of Aleppo pine (*Pinus halepensis* Mill.),
- (2) mixed high forest of Aleppo pine and cypress (*Cupressus sempervirens* L.);
- (3) pure forest of cypress;

4) mixed forest of olives (*Olea europea* L.) Arbutus (*Arbutus Andrachne* L.), Kermes oak (*Quercus coccifera* L.), juniper (*Juniperus phoenicea* L.). The underwood of all these types of forest consists of terebinth and mastic (*Pistacea terebinthus* L., *P. lentiscus* L.), brooms (*Genista sphacelata* var. *bovilliana*) and Crete thyme (*Thymus capitatus* Hoffm. and Link.).

The principal types of forest in the southern mountains are:— (1) pure high forest of Aleppo pine; (2) pure high forest of Corsican pine (*Pinus nigra* var. *pallasiana* Lamb.); (3) pure forest of cedar (*Cedrus brevifolia*), or mixed with Aleppo pine; (4) dwarf oak forests (*Quercus alnifolia* Poech.); (5) mixed high forest of plane and alder (*Platanus orientalis*, *Alnus orientalis* Spach.); (6) orchard type of hard wood with a preponderance of carob trees (*Ceratonia siliqua* L.) and olives; (7) forests of juniper; (8) dyer's oak and Kermes oak (*Quercus lusitanica* Lamk. and *Q. coccifera* L.) which are found in some districts. The artificially created forests consist of plantations of acacia (wattle) pure or with Aleppo pine and stone pine (*Pinus pinea* L.) as dominant trees, cypress (*Cupressus sempervirens* L.) and eucalyptus (*Eucalyptus tereticornis* Smith).

The most important species in the island are:— Aleppo pine (considerable production of timber); Corsican pine (*Pinus nigra* var. *pallasiana*) (timber); Eastern cypress (timber); dwarf oak (building timber, coach building, fuel); arbutus (chairs and firewood); plane (highly esteemed cabinet wood); oriental alder (building timber and cabinet wood); Cyprus cedar (*Cedrus brevifolia*) (very fine cabinet wood); dyers' oak (*Quercus lusitanica* Lamb.) (good building timber and firewood); Troödos juniper (*Juniperus foetidissima*) (pencil wood); Cyprus juniper (building and rafter timber) bay-tree (*Laurus nobilis* L.) and Storax (*Styrax officinalis* L.) (hard, resistant wood but little used); terebinth, olive and azerol hawthorn (*Crataegus azarolus* L.), the wood of which is not sufficiently appreciated, are all used as firewood; Cyprus maple (*Acer obtusifolia*) (a fine white wood, not used); European walnut (*Juglans regia* L.) (timber); Mulberry (*Morus alba* L.) (wood for cabinet making); Persian lilac (*Medea Azedarach* L.) (exotic, wood for carpentry and firewood); eucalyptus (*E. tereticornis*) (exotic, building timber); stone pine (*Pinus pinea* L.) (building timber); prickly juniper (*Juniperus oxycedrus* L.) (wood for carpentry and firewood); Kermes oak. (*Quercus coccifera* L.) (wood for carpentry) and wattle (*Acacia cyanophylla*) (an exotic introduced species, important as firewood). The total forest area is 409,470 acres of which 96 % are State property. Estimates made over 213,165 acres of the above-mentioned area have given as result a standing growing stock of all species of 90,000,000 cubic feet. Almost 1/6th of the total area was cut over during the war but in many cases sufficient seed-bearers to assure natural regeneration were left. The really productive area is at present 450 square miles

As regards afforestation of land not under forest, there are about 400,000 acres available for planting which, according to the writer will be most useful for the water-supply of the island. The Forest Department which makes great efforts for popularizing afforestation distributes gratuitously from 50,000 to 90,000 seedlings every year. After the delimitation of the forests, improvements on a large scale have been made by the grafting of carob trees and olives and the yield of these trees has thus been much increased. In the same period the Forest Department has distributed to the villagers 815,082 wild olive seedlings taken from the forest.

Regarding natural regeneration the writer reports that in shady places the Aleppo pine reproduces itself perfectly and that many seedlings survive. It appears that for this species there is only one good reproduction year in thirty. The planting of eucalyptus and acacia has been intensified during the period from 1908-1921 and large areas of forest have been planted and sown with Aleppo and stone pine, cypress and other exotic species ; of the latter stone pine, walnut and *Acacia cyanophylla* have been among the most useful

Forestry in Coorg during 1925-26.

ROBINSON G C Chief Forest Officer *Progress Report of Forest Administration in Coorg for 1925-26*, p 4 Bangalore (Mysore), 1926

The progress of areas under regeneration in the forests of the East is satisfactory. In the regeneration sections of the "Felling zone" the majority of the young seedlings have become saplings, i. e., now have a stem diameter not exceeding 10 cm.

The natural regeneration under control is only important in area "Y" (1) of Anekad, where the system of felling is however too rapid to be useful to the greater part of the already advanced regeneration of *Dalbergia latifolia* Roxb. and *Pterocarpus marsupium* Roxb.

As regards artificial regeneration, the writer says that of 25 acres felled at Kalhalla in the previous year, teak (*Tectona grandis* L.) seed was sown on 17 acres in March-April and *Pterocarpus Marsupium* seed on 2 acres, while on the 6 remaining acres 3,309 "stumped" teak plants taken from the 1923-1925 nurseries were planted during the month of August. The percentage of successful plants on the sown area is about 40-50, while that of the successful transplanted plants is 70-80. The results obtained 12 months later show that these transplants grow more quickly than the plants obtained by sowing.

(1) Area "Y" = area treated by improvement fellings in favour of the young trees. *Ed.*

In area "Y" of Balecove, 99 acres which had been treated unsuccessfully in the previous year were again burnt over and were then sown with *Pterocarpus Marsupium* and *Terminalia tomentosa* W. and A., but the result was poor.

In the Mercara forest 22 acres were planted with *Eucalyptus robusta* Smith. As experience has proved that many of the transplanted plants of this species die from excessive transpiration, the tops were cut off to remedy this defect. Sowings made in January have produced plants with too long stems and this fact proves that sowing should be done later and with wider spacing.

No afforestation of land was done during the year.

Regarding regeneration outside the working plans, the writer states that no new "Kumri" (2) have been made during the year. In those planted during the previous year and re-sown with teak, the percentage of surviving plants was 20 to 50 according to the different districts. Generally "kumri" have suffered owing to shortage of native manual labour. In the old "kumri" 11,950 bamboo nodes were planted with poor results, probably due to lateness in planting.

The sowing of sandalwood (*Santalum album* L.) on 47 acres of cleared spaces in the plantations of the Southern Division was extremely unsuccessful; germination was good, but the young seedlings were destroyed by rats and squirrels.

In the "Y" areas in the plantations and "kumri" planted in previous years, weeding and climber cutting were carried out. It is however observed that it is a mistake to try to destroy herbaceous growth in the regeneration of *Pterocarpus Marsupium* and *Dalbergia latifolia*, since the young plants do not suffer from immersion in grass, which on the contrary affords them valuable protection against wild animals prone to eat off their leaves and shoots.

(2) "Kumri" are crops of teak planted by the natives together with cereals, generally hill paddy and "ragi" (*Eleusine coracana* Goertn.) They are burnt over the following year, thus procedure helps the growth of the teak. Ed

PLANT PROTECTION

DISCOVERIES AND CURRENT EVENTS IN WORLD PHYTOPATHOLOGY

Belgian Congo : A New Disease of the Oil Palm (*Elaeis guineensis*) (1).

Symptoms : complete disorganization of the collet and of the base of the stipe, followed by progressive necrosis, causing a very characteristic, lageniform hypertrophy of the trunk with the emission of adventitious, aerial roots at a certain height from the ground and above the injured parts

Agent of infection : a white stromatic or filamentous mycelium of a species of Basidiomycetes whose fructifications have not been found. The tree attacked dies quickly

The pathogeny of this parasite, observed for the first time in the Equatorial Province, is being studied.

Greece : Bacterial Diseases of Tobacco in connection with *Gnorimoschema heliopa* in Thessaly (-).

Despite this year's excessive drought, which has prevented the development of any kind of cryptogamic disease of tobacco in Thessaly, a slight fall of rain which occurred at the end of July has led to the loss of a quantity of late planted tobacco owing to the destructive action of several bacterial diseases.

Among these we must call attention to a disease which is attributed to *Bacillus aeruginosus* Delacr, which has been serious especially in the neighbourhood of Volo, to another caused by *Bac. maculicola* Delacr. and to " Wildfire " caused by *Bacterium tabacum* Wolf and A. C. Foster.

The last, although existing in Greece in an endemic state, only rarely causes serious damage, which is generally confined to young plants, owing to the frequent changes in temperature and the degree of humidity existing at that time.

(1) Communication from the official correspondent to the Institute, Mr. J. GHESQUIERE, at Stanleyville.

(2) Communication from the official correspondent to the Institute, Mr. D. S. CAVADAS, Director of the Phytopathological Station of Pelion at Volo.

All these Bacteria appear first on tobacco plants attacked by *Gnorimoschema heliopa* Low; afterwards they are found on plants not attacked by this moth; the parasite is probably transmitted to the latter by the labourers who pick the leaves.

Gnorimoschema heliopa, which has been observed this year for the first time in Thessaly on a fairly large scale, is attracting the attention of those affected by the damage caused. Its larva, which is very harmful, produces a swelling of the stalk in the form of a gall in the young plants and it also destroys the pith of the older plants which atrophy in consequence.

All precautions will be taken next year to prevent the spread of this moth which, apart from the immediate damage caused, may prove exceptionally dangerous by reason of its inoculation and propagation in the plants attacked of different parasites which subsequently may cause the death of those plants

Kingdom of the Serbs, Croats and Slovenes: Some less known Insects causing Damage in Dalmatia (1).

Polyphylla lesinae Reitt (?). — The larvae of a large species of *Melolonthinae* inflict serious damage on the vine in sandy soils of the island of Lesina and Lopud. They gnaw the part of the stock that is below the ground, so that the plant, especially if young, perishes altogether.

The adult has not yet been bred out, and hence it is impossible to be absolutely certain whether it is the species referred to or not.

Cebrio insularis Chvr. (?) — The larva of this Coleopteron corresponds as regards its characteristics to the description of *C. insularis*; but as the adult has not yet been bred out it cannot be stated categorically that it is the insect in question.

In any case the larvae inflict great damage at Lumbarda (island of Curzola) on plantations of water-melon (*Cucumis Citrullus*), gnawing the underground part of the stalk so that the plant withers and dries up. In one hollow where there were four or five plants of water-melon, 35 larvae were found.

It is also reported by the peasants that the larvae attack the small-headed cabbage.

Othorrhynchus polycoccus Gyll. — This Coleopteron, which is unknown in Northern and Central Dalmatia, has been found at Gruda (Ragusa). The adult does immense damage by gnawing the buds and the young shoots of the vines. It appears early in spring, as soon as the buds begin to open. When the shoots have grown to about 10 centimetres in length, the insect disappears, and there is no longer any danger of damage to the vines.

The Coleopteron appears somewhat sporadically: one vineyard is completely invaded while in another close by there is no trace of the

(1) Communication from the official correspondent to the Institute, Mr. P. NOVAK, Chief of the Entomological Station, Split.

insect. Sometimes one part only of the vineyard is infested, while a corner may be entirely free from the pest.

The adult is nocturnal, and is caught at night by the peasants who make use of small lamps. Their method of protecting the vineyards from this pest is to wrap the spurs of the vine stocks in paper or linen bags, tying them firmly to the base. If the bag is not firmly tied, the insect penetrates and gnaws all the green part. Thirty-five individual specimens of *Otiorrhynchus* have been found in one badly tied bag.

Control experiments with arsenical salts will be made during the next spring.

Otiorrhynchus dalmatinus Gyll. — This insect inflicts serious damage on the olive, especially in the island of Curzola, eating the leaves and also the flowers in May. It hides under the leaves during the day and its mischievous work is done at night.

Cryptoblabes gnidiella Mill. — In Dalmatia *Conchylis ambiguella* has not so far been found and in all probability does not exist, as it is a northern insect: the vine worm is represented in Dalmatia by *Polychrosis botrana*. In the first and second generation the latter only appears, but along with the third there also appears on the nearly ripe grapes the caterpillar of *Crypt. gnidiella*.

It is probable that the first generation of this Microlepidopteron develops on some other plant, possibly a wild plant, and only passes to the grape vine in autumn.

VARIOUS QUESTIONS RELATING TO PLANT PROTECTION IN THE DIFFERENT COUNTRIES

Algeria : Flights of Locusts during the Month of October 1927 (1).

6 October — Flights of Migratory locusts (*Acridum peregrinum* = *Schistocerca tatarica*)

29 October. — Flights of locusts, apparently of the above species, not in compact swarms but of frequent occurrence for some time past in the palm groves of Touat. Flights of very compact swarms are notified much more to the East outside the territory of the post. Important flights caused damage between 20 and 22 October in the Caidats Boufadi and Fenouguil. Further information has been requested from the posts concerned.

(1) Communication from the Governor General of Algeria to the President of the International Institute of Agriculture.

Fiji: Entomological Notes (1).

Cryptolaemus montrouzieri, Muls. — This ladybird was introduced into Fiji in 1924, and seems to have established itself, although only in small numbers, having recently been recovered in the field on two occasions.

Dacus passiflorae, Frog. — This fruit fly has this year been found attacking the bolls of certain varieties of cotton, viz.: Caravonica hybrid heavily, and Meade and Kidney lightly. It has also been found in Paw-paws, which is a hitherto unrecorded host plant.

Sierra Leone: Experiments on Ginger Scale (2).

The following are results of experiments with regard to the scale (*Aspidiotus hartii*, Ckll.) which attacks the rhizomes of ginger.

Samples of ginger have been seen where the whole surface of the rhizome was covered with scale insects. As may be realised, these must cause an appreciable loss, more especially as the insects feed and breed both in the field and in store.

Since ginger is sometimes supplied by the Government for planting in various parts of the country, it was important for it to be clean so as not to distribute the scale, and further to ascertain what effect such infestation had on the crop.

A particularly badly infested sample was used, which accounts for the low yield, so the results are purely comparative.

Some of this was fumigated with hydrocyanic acid gas for a period of 1 ½ hours, one ounce of potassium cyanide per hundred cubic feet being used.

Plots of 1/32nd acre were planted with each, treated and untreated, in June 1926, seven pounds of ginger being used in each case.

The plots were harvested on the 19th February, and the yields of fresh rhizome were 10 lbs 6 ozs for the treated and 3 lbs 9 ozs for the other, the latter being heavily infested with scale insects, the former free.

It may be stated therefore that the loss due to scale attack was 6 lbs 9 ozs, or practically 65 %.

These were stored separately and weighed again on the 27th June 1927, giving 1 lbs 2 ozs for the untreated and 4 lbs 12 ozs for the treated.

The former therefore had lost 2 lbs 7 ozs or 68 % and the latter 5 lbs 10 ozs or 54 %.

The difference between these, viz. 14 % represents the loss while in store due to scale insects.

The total percentage therefore is 79, in addition to which the resulting ginger, after being stored for a period of four months was of no commercial value.

(1) Communication from the official correspondent to the Institute, Mr. Hubert W. SIMMONDS, Government Entomologist, Department of Agriculture, Suva.

(2) Communication from the official correspondent to the Institute, Mr. E. HARGREAVES, A.R.C.S., F.E.S., Entomologist, Lands and Forests Department, Experimental Farm, Njala.

LEGISLATIVE AND ADMINISTRATIVE
MEASURES

Germany (Reich). — By Proclamation of the "Reichsminister für Ernährung und Landwirtschaft" and of the Minister of Finance, of 22 July, 1927, importations of all young plants not belonging to the genus *Vitis*, shrubs and other plants originating in nurseries, gardens or greenhouses, are legalized henceforth additionally through the customhouses at Cranenburg (Cleve) and at Neu Bentschen, while the custom-house at Stensch railway station is abandoned and will no longer function as a place for the entry of plants etc. (*Ämtliche Pflanzenschutzbestimmungen*, Berlin, 1. Oktober 1927, Nr. 11, S. 190).

****** By Proclamation of the "Reichsminister für Ernährung und Landwirtschaft" and of the Minister of Finance, of 16 August, 1927, the importation of all young plants not belonging to the genus *Vitis*, shrubs and other plants originating in nurseries, gardens or greenhouses may take place also in future through the custom-house of Kohlscheid. (*Ämtliche Pflanzenschutzbestimmungen*, Berlin, 1. Oktober 1927, Nr. 11, S. 191).

Germany (Prussia). — A Police Order of the "Regierungspräsident" of Frankfort on Oder of 15 August, 1927 forbids the preserving, keeping and export of the Musquash (*Fiber zibethicus*). Provision is made only for exemptions for scientific purposes, in which case the living Musquash can only be exported or kept in iron cages or in metal bound chests. Owners, occupiers, users and tenants, owners of fishing and shooting rights, forest officials and public security organizations are ordered to inform the local police authorities directly a new appearance of the Musquash is noted. Non-compliance with the terms of this Police Order, which comes into force on the day of its issue, will be visited by fines not exceeding 150 RM or a corresponding term of imprisonment. (*Ämtliche Pflanzenschutzbestimmungen*, Berlin, 1. Oktober 1927, Nr. 11, S. 191).

Germany (Thuringen). — A Police Order of the Thuringian Ministry of the Interior and Economy (Economy Section) of 30 July, 1927 makes it obligatory for owners, users or tenants of land or for their lawful representatives to disinfect thoroughly those parts of apple trees which have been attacked by Woolly Aphis [*Eriosoma lanigerum*] and to destroy this insect. Moreover the above persons must remove dying and withered apple trees and such trees as have been so badly attacked by Woolly Aphis as to render further control measures seemingly useless, together with the top parts of their roots and destroy the Woolly Aphis colonies. Inspec-

tion of apple trees must be rendered possible to those charged with supervising the fulfilment of the order. In case of refusal to carry out the measures ordained by the order, the "Landräte" and "Stadtvorstände" of the district are instructed to proceed to investigations and measures of destruction at the cost of those whose duty it really is. Infringements will be punished by fines not exceeding 150 RM or by imprisonment not exceeding 6 weeks. The order, which came into force on 15 August, 1927, cancels as from that date all other orders on the same subject. (*Ämtliche Pflanzenschutzbestimmungen*, Berlin, 1. Oktober 1927, Nr. 11, S. 192).

Austria (Vienna). — In fulfilment of the provisions contained in Federal Law ("Kartoffelkrebsegesetz") of 28 July, 1926 (*B. G. Bl.* Nr. 215) relating to the control of wart disease, the Vienna Council in its capacity as Diet ("Landtag") has issued Law No. 33 of 28 July, 1927 for the control of wart disease, the provisions of which are essentially the same as those issued for the Burgenland (see No. 5 of this Bulletin). (*Landesgesetzblatt für Wien*, 3. September 1927, Jahrg. 1927, Stück 16, S. 39-42).

Canada. — By Decree of the Governor General in Council dated 11 August, 1927, No. 1526, Regulation No. 14 (foreign) established by Decree of 20 April, 1927, No. 717 (see this Bulletin No. 7) is cancelled and replaced as follows:—

"Regulation No. 14 (foreign) 2nd revision, prohibiting the importation into certain parts of Canada of fresh peaches, peach nursery stock, etc., coming from certain States of the American Republic.

(1) The importation into the Province of Ontario of fresh peaches and of peach nursery stock coming from one of the United States of America situated East of the Mississippi and of the Saint-Croix River is prohibited.

(2) The importation into the Province of British Columbia of fresh peaches and of peach nursery stock, as also of peach stones or seeds for propagation purposes coming from parts of the United States of America, mentioned in article 1, and, in addition from the States of Arkansas, Louisiana, Missouri and Texas is prohibited. ¶

(3) All consignments of fresh peaches and of peach nursery stock intended for importation into Ontario and coming from parts of the United States of America other than those mentioned in article 1, as also all consignments of peach stones or seeds for propagation purposes, intended for importation into British Columbia, and coming from one of the United States of America West of the Mississippi and Saint-Croix River (except the States of Missouri, Arkansas, Louisiana and Texas) shall be accompanied by a declaration duly signed by the consignor, giving the name of the State of origin. All such consignments will be passed by the customs only on presentation of the necessary certificate and entry declaration.

(4) The present regulation does not prohibit the transport across the Province of Ontario of fresh peaches and of peach nursery stock, or peach stones, whatever their origin, which are crossing Ontario under a bill of

leading to a destination in Canada outside Ontario other than in the Province of British Columbia". (*The Canada Gazette*, Ottawa, 27 August, 1927, pp. 571-572).

United States of America (Florida). — "The Florida Plant Act of 1927" was duly approved on 19 May, 1927. Its aim is to prevent the introduction into and the dissemination within Florida of insect pests and diseases injurious to plants and plant products, to provide for the inspection and control of nurseries, to regulate the sale and distribution of plants and plant products, to create a State Plant Board and to prescribe its powers and duties, and to make an appropriation for the purpose of carrying on the provisions of the said Act.

The State Plant Board, herein after called the Board, shall be composed of 5 members who shall be the members constituting the Board of Control created and authorized by the provisions of Chapter 5384, Laws of Florida 1905, and shall enjoy all the authority and exercise all the duties of this latter. A majority of the members shall constitute a quorum. The chairman shall be elected annually by the members. A suitable office or offices shall be provided at the University of Florida for the meetings of the Board and for the deposit of records.

It shall be the duty of the Board to protect the agricultural and horticultural interests of the State from insect pests and diseases, and to that end it is vested with power and authority to :—

Inspect by means of duly authorized employees plants, plant products and other substances capable of disseminating or carrying insect pests and diseases.

To carry on investigations on methods of control, eradication and prevention of dissemination of insect pests and diseases.

To make rules and regulations to govern the sale and distribution of nursery stock.

To demand of any person, who has plants or plant products likely to carry pests and diseases in his possession, full information on the matter.

To declare a dangerous insect pest or disease to be a public nuisance.

To declare a quarantine against any area, place, nursery etc. in respect of dangerous insect pests or diseases and to prohibit the movement within the State or any part thereof or the introduction into the State of all plants, plant products or other matters coming from such quarantined areas, and to authorize under special rules and regulations certain conditions under which these prohibited articles may be moved into or within, sold or otherwise disposed of in the State.

To intercept and inspect in transit or on arrival all plants, plant products and other matters likely to carry insect pests and diseases injurious to plants already inside the State, and in case of infection being determined to return the goods to the sender, to destroy them or treat and release them in accordance with the Board's regulations.

To appoint such officials as are necessary, to prescribe their duties and fix their compensation.

To enter into co-operative arrangements with all persons and bodies capable of forwarding the end desired and to contribute a just proportionate share of expenses so incurred.

To publish at regular intervals, as may be thought expedient, an official organ of the Board for public distribution and to publish and distribute to the public any further information deemed necessary to enforce the provisions of the Act by writ of injunction as well as by criminal proceedings. It shall be the duty of State Attornies, County Solicitors and all Public Prosecutors in each county to represent the Board when called upon

All the rules and regulations made by the Board shall be promulgated by being published in the official organ of the Board or by some other reasonable prescribed method of publication.

The introduction into the State of any live insect or specimen of any disease injurious to plants may only be made under special permit from the Board.

Any person receiving consignments in connection with which the Board's regulations have not been complied with must immediately inform the Board and hold the goods at the disposal of the Board.

Any person violating any provision of this Act or who shall have forged, counterfeited or destroyed or wrongfully used the Board's certificates or who shall have obstructed any employee of the Board in the performance of his duties shall be subject to a fine of not less than 250\$ and not more than 500\$, or to imprisonment for not more than 6 months or to both.

The sum of 35,000\$ a year is appropriated to the Board for the purposes of this Act

The State Plant Board created by this Act is hereby created a corporate body possessing all the rights of such a body and having a special seal.

All Acts and parts of Acts inconsistent with this new Act are repealed, provided that the Plant Board as now existing under the Plant Act of 1915 shall continue to exist and function until the Plant Board provided for in this Act shall have been definitely established. All records, books and office equipment and other property belonging to the old Board shall be taken over by the new Board.

All the Provisions existing under the Plant Act of 1915 shall remain in force until their repeal by the new Plant Board. It is further provided that all employees of the old organization shall retain their positions under the same conditions until further rulings which may be made under the new Act

This Act shall take effect upon its passage and approval by the Governor or upon its becoming a law without his approval. (*The Monthly Bulletin of the State Plant Board of Florida*, Gainesville, Florida, 1927, vol. XII, no. 1, pp 1-7).

*** The State Plant Board on 23 June, 1927 adopted Rule 51 which contains the following provisions. By reason of the serious situation created through the recent discovery of the presence in

certain areas in the State of Texas of the Mexican Fruit Fly or Morelos Orange Maggot (*Anastrepha ludens*, Loew), and to prevent the introduction of this pest into the State of Florida, the importation of all host fruits of this pest including citrus, apple, plum, quince, peach, pear, mango, *Achras Sapota*, mamey, Anona and guava originating in or shipped from the Counties of Cameron, Hidalgo and Willacy or from such other areas as shall hereafter be found infested, is hereby prohibited. All such fruits arriving in the State of Florida in violation of this Rule shall be subject to immediate confiscation and destruction. (*The Monthly Bulletin of the State Plant Board of Florida*, Gainesville, Florida, 1927, vol. XII, no. 1, p. 11).

* * The State Plant Board at its meeting of 11 July, 1927 repealed its Rule No. 48 prohibiting the shipment into Florida of green beans, green peas, etc. from certain States known to be infested by the Mexican bean beetle [*Epilachna corrupta*] unless accompanied by a special permit.

Consequently, green beans and green peas may now be accepted for transportation into Florida without permit. (*The Monthly Bulletin of the State Plant Board of Florida*, Gainesville, Florida, 1927, vol. XII, no. 1, p. 11).

France. — Potatoes coming from countries infected with "Wart disease" (Germany, Belgium, Great Britain, Denmark, Finland, Ireland, Norway, Holland, Poland, Sweden, Switzerland, Czechoslovakia) may only be imported into French territory when accompanied by the phytopathological certificate (type annexe 1), prescribed by the Decree of 6 June, 1924, and potatoes coming from a country adjoining a country so infected (Austria, Spain, Hungary, Italy, Lithuania, Luxemburg, Rumania, Union of Socialist Soviet Republics) must be accompanied by the certificate (type annexe 2), prescribed by the above decree (*Journal officiel de la République Française*, Paris, 24 septembre 1927, 59^e année, n^o 222, p. 10026).

* * By Ministerial Decree of 15 September 1927, Belgium is now added to the list of countries infected by wart disease [*Synchytrium endobioticum*] given in art 1 of the Ministerial Decree of 6 June, 1924 and modified by the Ministerial Decree of 20 December, 1924 and of 2 November, 1925. (*Journal officiel de la République Française*, Paris, 24 septembre 1927, 59^{ème} année, n^o 222, p. 10013).

* * By Ministerial Decree of 15 October, 1927 Spain is added to the list of countries not infected but adjacent to countries infected by wart disease [*Synchytrium endobioticum*] specified in Art. 2 of the Ministerial Decree of 6 June, 1924 modified by Art. 2 of the Ministerial Decrees of 20 December, 1924, 2 November, 1925 and 15 September, 1927. (*Journal officiel de la République Française*, Paris, 20 octobre 1927, 59^e année, n^o 244, p. 10814).

*. By Decree of 30 September, 1927 the phytopathological Inspection Service set up at the Ministry of Agriculture and at present regulated by the Decree of 24 November, 1923 becomes entitled the "Service de défense des végétaux" (Plant Protection Service).

Its object is to ensure: (1) The sanitary supervision of plant production and the organization of defence against diseases and organisms harmful to plants and plant products; (2) The phytosanitary control of importations and exportations, the control of the farms from which the exported products come and the issue of phytosanitary certificates.

The Plant Protection Service carries out its functions by means of officers belonging to services not controlled by the "Direction" of Agriculture and by means of the Agricultural Offices; it works in collaboration with the Institute of Agronomic Research, and in particular with the Stations and Laboratories of Entomology, Phytopathology and Biology.

A Decree of the Minister of Agriculture determines, on the recommendation of the Director of Agriculture, and the advice of the Director of the Institute of Agronomic Research the boundaries of the phytosanitary "circonscriptions" with each of which an Agricultural Entomology Station and a Plant Pathology Station or similar establishments will collaborate, thus forming the scientific centre of the "circonscription".

The personnel of the Plant Protection Service is nominated by the Minister of Agriculture. It comprises: (1) A staff of permanent officers composed of 1 Inspector-Chief of Service; 8 inspectors; 1 secretary redactor; (2) A temporary personnel paid by the day and recruited as the service demands and within the limits of the amount allocated for the purpose in the Ministry of Agriculture's budget; this temporary staff comprises: (a) experts, preference being given to officers of the Ministries of Agriculture and of Education, whose duties are those of delegates or acting delegates of the "circonscription"; (b) controllers whose duty it is to assist the delegates and the acting delegates; (c) temporary assistants.

All plants or parts of plants intended for exportation which require a "certificat phytosanitaire" (phytosanitary certificate) must be accompanied by a "certificat de santé-origine" (certificate of original good health), which must be presented to the agents of the Plant Protection Service at the moment when the goods are submitted to their control.

The "certificat de santé-origine" and the "certificat phytosanitaire" can only be issued for products derived from crops regularly submitted to State phytosanitary control.

The officers empowered to issue the above certificates are appointed by Decree of the Minister of Agriculture.

Any grower wishing to submit his crops or products to the control of the "certificats de santé-origine" or of the "certificats phytosanitaires" must apply on special stamped forms under the conditions and in accordance with the model prescribed by the Decree of the Minister of Agriculture.

Inscription on the lists of phytosanitary control is valid for one year, from 1 January to 31 December.

The request for inscription must be sent to the Minister of Agriculture

(Plant Protection Service) between 1 November and 31 December (last possible date) each year.

Growers or exporters can on special request obtain a permanent inscription and so avoid the necessity for yearly renewal.

All expenses resulting from the control covered by the present Decree, and determined at the end of each financial year by a Decree of the Minister of agriculture, are covered by a tax of 50 francs — or of 100 francs in the case of permanent inscription — paid on each inscription to the State Phytosanitary Control and by a special supertax of 100 francs paid on inscriptions made after 31 December. The surplus expenses are divided among the exporting beneficiaries of the control, in proportion to the market value of the products controlled, for which the issue of certificates has been requested. (*Journal officiel de la République Française*, Paris, 7 octobre 1927, 59^e année, n° 233, p. 10416-10417).

Italy. — According to the terms of the Ministerial Decree of 8 September, 1927 the duties assigned to the "R. Stazione di Patologia vegetale" of Rome by the Ministerial Decree of 15 July, 1927, with reference to the regulations for the importation of seed potatoes for the season 1927-28, are also assigned to the Laboratory of Plant Pathology of the "R. Istituto superiore agrario" of Milan and to the Laboratories of Plant Pathology and Agricultural Entomology of the "R. Istituto superiore agrario" of Portici (*Gazzetta ufficiale del Regno d'Italia*, Roma, 13 ottobre 1927, anno 68^o, n. 237, p. 4070).

RECENT BIBLIOGRAPHY

Balachowsky, A. Contribution à l'étude des Coccides de l'Afrique mineure [1^{re} note]. *Annales de la Société Entomologique de France*, Paris, 1927, vol. XCVI, année 1927, 2^e trimestre, p. 175-207, fig. 1-17.

[List of all the species described and observed in Algiers, Tunis and Morocco up to December 31, 1926. Are described as new the following species observed in Central and Western Sahara: 1) *Targionia deserti* on *Retama Retam*, 2) *Leucaspis lemmata* on *Ephedra alata*, 3) *Aonidia flavas* on *Tamarix articulata*. There is also the description of a new species living on *Cistaceae* in Algiers: 1) *Cerococcus cistarum* on *Fumana glutinosa* and *Cistus heterophyllus*; 2) *Eriococcus heteracanthos* on *F. glutinosa*. All in all, the Coccids enumerated are one hundred and eleven].

Bryan, MARY K. Beef infusion versus beef extract media. *Phytopathology*, Lancaster, Pa., 1927, vol. 17, no 6, pp. 413-414.

Clayton, E. E. Diplodia ear-rot disease of corn. *Journal of Agricultural Research*, Washington, D. C., 1927, vol 34, no. 4, pp. 357-371.

[*Diplodia Zeae* (Schw.) Lév.]

Colley, REGINALD H. and Taylor, MINNIE W. *Peridermium kurilense* Diet. on *Pinus pumila* Pall., and *Peridermium indicum* n. sp. on *Pinus excelsa* Wall. *Journal of Agricultural Research*, Washington, D. C., 1927, vol. 34, no. 4, pp. 317-330, fig. 1.

[*P. kurilense* in the Kurile Islands, Japan, *P. indicum* at Kulu, North-Western Himalaya, India]

Constantin, J. Importance économique et agricole des cultures montagnardes tropicales. *Comptes rendus hebdomadaires des séances de*

l'Académie des Sciences, Paris, 1927, 1^{er} semestre, tome 184, n° 24, p. 1385-1388.

[Deals with the practical efficacy of the "cure d'altitude" against the disease of the sugarcane, called "Sereh" in Java which shows a manifest analogy with degeneration disease.]

Efflatoun, H. C. On the morphology of some Egyptian Trypaneid larvae (Diptera) with descriptions of some hitherto unknown forms. *Bulletin de la Société Royale Entomologique d'Egypte, Le Caire, 1927, nouv. sér., année 1927, fasc. 1, p. 17-50, fig. 1-9, pl. I-VIII. Bibliography, p. 45-50.*

[*Dacus oleae* Gmel in the fruits of *Olea europaea*, *O. chrysophylla*, *O. verrucosa*, etc. *D. longistylus* Wied in the fruits of *Calotropis procera*, *Carpomyia incompleta* Beck in the fruits of *Euphorbia* *Spina Christi* and *Z. Jujuba*, *Ceratitis capitata* Wied prevalent in oranges mandarins, peaches, apricots, figs, mangoes and guavas *Sphecomomyia debilis* Efflat in the blossoms of *Stachys aegyptiaca*, *Sphen. filiola* Lw in the blossoms of *Lavandula coronopifolia* *Myopites vario* Jaciata Beck in the blossoms of *Insula christioides*, *Oedaspis trotteriana* Bezzi in the galls of the stalk of *Artemisia monosperma*, *Schistopterum combrum* Beck in the inflorescences of *Pluchea* (*Conyza*) *Dioscoridis* *Terellia jaceae* Rob - Desv in the capitulum of *Centaurea pallescens* and *C. calcitrapa*, *T. planiscutellata* Beck in the fruits of *Pl. Dioscoridis* *Sphenella marginata* Fall in the capitulum of *Picris Sprengeriana* and of *Senecio coronopifolius*, *Spathulina parviegutata* Beck in the inflorescences of *Coruana praelensis*, *Euaereta iphionae* Efflat in the galls of the branches of *Iphiona mucronata* *T. irritis desertorum* Efflat in the inflorescences of *Launaea spinosa*, *T. pulcherrima* Efflat in the inflorescences of *L. nudicaulis* *Trypanea angur* Frfld bred from *Asteriscus graveolens* and *Pulicaria crispata*, *T. stellata* Fuesli bred from the inflorescences of *Chrysanthemum coronarium*, in Egypt]

Evans, H. H. Oil sprays Their use and effectiveness in control of fruit-tree leaf-roller, oyster-shell scale, and blister-mite (under interior conditions of B. C.). *Province of British Columbia. Department of Agriculture (Horticultural Branch). Circular No. 68 (New Horticultural Series), Victoria, B. C., 1927, 11 pp., 8 figs.*

[*Cacoecia argyrosplata*, *Lepidosaphes ulmi*, *Eriophyes pyri*]

Ferraris T. La «nebbia» della robinia pelosa (*Robinia hispida* L.) *Curiamo le Piante* I e *La Difesa delle Piante contro le Malattie ed i Parassiti*, Alba, 1927, anno IV e XXII, n. 6, pp. 113-114, 1 fig.

[*Ovulariopsis monospora* Sacc.]

Flachs. Achtung auf den Kleekebs. *Praktische Blätter für Pflanzenbau*

und Pflanzenschutz, Freising-München, 1927, V. Jahrg., Heft 3, S. 69-70. [Sclerotinia Trifoliorum]

Flanders, STANLEY E. An infestation index for fruit pests. *Journal of Economic Entomology, Geneva, N. Y., 1927, vol. 20, no. 3, p. 544.*

Fleming, WALTER E. Effect of soil microorganisms on paraffin used as a coating to decrease the injurious action of lead arsenate on plant roots. *Journal of Agricultural Research, Washington, D. C., 1927, vol. 34, no. 4, pp. 335-338.*

Fleury, A. C. A serious pest threatens *Bulletin of the Department of Agriculture, Sacramento, California, Sacramento, 1927, vol. XVI, no. 5, pp. 291-293, fig. 62-63*

[*Anastrepha ludens*]

Fracker, S. B. Advantages and disadvantages in the use of printed certificate tags. *Journal of Economic Entomology, Geneva, N. Y., 1927, vol. 20, no. 3, pp. 458-464.*

Frost, S. W. Beneficial insects trapped in bait-pails. *Entomological News, Philadelphia, Pa., 1927, vol. XXXVIII, no. 5, pp. 153-156, 1 fig*

Fryer, I. C. F. and Stenton, R. Pyrethrum-growing for insecticidal purposes. *The Journal of the Ministry of Agriculture, London, 1927, vol. XXXIII, no. 10, pp. 916-920, fig. 1-2.*

Gilman, J. C. and Abbott, E. V. A summary of the soil fungi. *Iowa State College Journal of Science, Ames, Iowa, 1927, vol. I, no. 3, pp. 225-343, fig. 1-83.*

Godilliac, A. La folle avoine. Comment arrêter son extension et restreindre ses dégâts. *Le Progrès Agricole et Viticole, Montpellier, 1927, 48^e année, tome LXXXVIII, n° 29, p. 67-69.*

Happacher, E. Dell'*Icerya purchasi* e dei mezzi di lotta per combatterla. *Giornale di Agricoltura della Domenica, Piacenza, 1927, anno XXXVII, n. 21, p. 187, 1 fig.*

Hinds, W. E. and Spencer, HERBERT. Sugarcane borer control aided

through utilization of infested and trap corn. *Louisiana State University and Agricultural and Mechanical College, Agricultural Experiment Stations, Louisiana Bulletin No. 198*, Baton Rouge, Louisiana, 1927, 26 pp., 1 fig., pl. I-II.

[*Diatraea saccharalis crambidoides* Grote].

Hixon, R. M. and Drake, C. J. Chemical testing of nicotine dusts. *Iowa State College Journal of Science*, Ames, Iowa, 1927, vol. I, no. 3, pp. 373-377, fig. 1-3.

Hollowell, E. A., Monteith, JOHN, Jr., and Flint, W. P. Leafhopper injury to clover. *Phytopathology*, Lancaster, Pa., 1927, vol. 17, no. 6, pp. 390-404, fig. 1-3.

[*Empoasca fabae* Harris]

Köck. Ein Hederichbekämpfungsvorversuch mit dem Hederichvertilgungsmittel "Raphanit". *Wiener Landwirtschaftliche Zeitung*, Wien, 1927, 77. Jahrg., Nr. 27, S. 243.

[Hederich = *Raphanus Raphanistrum*].

Linford, MAURICE B. and Sprague, RODERICK. Species of *Ascochyta* parasitic on the pea. *Phytopathology*, Lancaster, Pa., 1927, vol. 17, no. 6, pp. 381-397, fig. 1-2, pl. XVI-XVII.

[*Ascochyta* Piss Lib., *Mycosphaerella pinodes* (Berk et Blox) Stone, *M. pinodes* (Berk et Blox) Stone, microform ?].

Manzoni, LUIGI. Danni prodotti al pero dal *Telephorus obscurus*. *Note di Frutticoltura*, Pistoia, 1927, anno V, n. 7, pp. 135-137, fig. 10.

Mayné, R. Entomologie coloniale. Instructions pour la récolte, la conservation et l'envoi de collections entomologiques. *Annales de Gembloux*, Bruxelles, 1927, 33^{me} année, 4^{me} livraison, p. 137-144, fig. 1-3.

Mercuri, S. I preziosi ausili naturali dell'agricoltura. I parassiti dei parassiti delle piante. *Il Lavoro d'Italia Agricola*, Roma, 1927, anno I, n. 27, p. 4, 3 figg.

Miestinger, K. Zur Wühlmausfrage. *Die Landwirtschaft*, Wien, 1927, Jahrg. 1927, Nr. 4, S. 145-147, Fig. 39-41.

[*Microtus arvalis* Pallas, *Arvicola schermani* Shaw, *A. schermani exilis* Miller, *Pitymyse subterraneus subterraneus* Seely, *Microtus agrestis* L.].

Miles, HERBERT W. and Petherbridge, F. R. The control of wireworms in glasshouses. *The Journal of the Ministry of Agriculture*, London, 1927, vol. XXXIII, no. 10, pp. 931-939.

[*Agriotes obscurus*, *A. sputator*].

Minerbi, GIUSEPPE. Aborti delle spighe di frumento. *Il Gazzettino Agricolo*, Padova, 1927, anno V, n. 31, p. 1.

[The alteration observed in the region of Ferrara, Italy, was in some cases caused by *Ophiobolus graminis* and *Leptosphaeria herpotrichoides* and in others by an attack from *Sclerospora macrospora*].

Muesebeck, C. F. W. New species of Chalcid flies parasitic on the gipsy moth parasite, *Apanteles melanoscelus* (Ratzeburg). *Journal of Agricultural Research*, Washington, D. C., 1927, vol. 34, no. 4, pp. 331-333.

[*Coelopsitha scutellata* n. sp., *Hypopteromalus mimicus* n. sp., *Dimmockia pallipes* n. sp.]

Munerati, O. La lotta contro il carbone del granoturco. *Giornale di Agricoltura della Domenica*, Piacenza, 1927, anno XXXVII, n. 21, p. 188.

[*Ustilago Maydis*]

Nisikado, YOSIKAZU. Temperature relations to the growth of graminicolous species of *Helminthosporium*. I. Effect of temperature on the vegetative and reproductive growth of *Helminthosporium turcicum* Passer and *Helminthosporium Maydis* Nisikado et Miyake. *Berichte des Okara Instituts für landwirtschaftliche Forschungen in Kurashiki, Provinz Okayama, Japan*, Kurashiki, 1927, Bd. III, Heft 3, S. 349-377, Fig. 1-10, Pl. XXVI-XXIX.

Nonell Comas, JAIME. Dos moscas que atacan a los frutos: *Ceratitis capitata* (Wied.), «mosca de los frutos», y *Drosophila ampelophila* (Lw.), «mosca o mosquito del vinagre». *Cuerpo Nacional de Ingenieros Agrónomos, División Agronómica de Experimentaciones, Estación de Patología vegetal de Barcelona, Divulgación nº 5*, Barcelona, 1927, 30 págs., 15 figs.

Ogilvie, LAWRENCE. An important virus disease of *Lilium longiflorum* and its varieties. *Nature*, London, 1927, vol. 119, no. 2997, p. 528.

Ott, J. Ein Versuch mit Raupenleimringen. *Landwirtschaftliche Fachpresse für die Tschechoslovaken*, Tettschen, 1927, 5. Jahrg., Nr. 19, S. 161-162.

Passalacqua, T. Il vajolo della melanzana prodotto dalla *Ascochyta horticola* (Spegazz.) Smith C. A. Curiamo le Piante! e La Difesa delle Piante contro le Malattie ed i Parassiti, Alba, 1927, anno IV e XXII, n. 7, pp. 129-130, tav. VII.

Passalacqua, T. La septoriosi del sedano prodotta dalla *Septoria Apis* Chester. Curiamo le Piante! e La Difesa delle Piante contro le Malattie ed i Parassiti, Alba, 1927, anno IV e XXII, n. 6, pp. 111-113, 1 fig.

Peglion, V. Le gelate tardive e gli effetti sulla vegetazione del frumento. *L'Italia Agricola*, Piacenza, 1927, anno 64, n. 7, pp. 359-363, 2 figg., 1 tav. a col.

Petch, T. Revisions of Ceylon fungi Part VIII. *Ceylon Journal of Science, Section A. - Botany, Annals of the Royal Botanic Gardens, Peradeniya*, Ceylon-London, 1927, vol. X, part 2, pp. 161-180.

Petch, T. and Ragunathan, C. The fungi associated with disease in Vanilla. *Ceylon Journal of Science, Section A. - Botany, Annals of the Royal Botanic Gardens, Peradeniya*, Ceylon-London, 1927, vol. X, part 2, pp. 181-196, pl. III-IV.

[On the leaves and stalks of *Vanilla planifolia* Andr., attacked by "soft rot" in Ceylon, there have been observed *Gnomoniopsis Vanillae* Stoncm., *Phyalospora Vanillae* Zimm. and two other fungi the specific names of which have not yet been defined]

Peyronel, B. Malattie del grano I — Mal del piede. *Ministero dell'Economia Nazionale. Direzione generale dell'Agricoltura. Servizio di Difesa delle Piante. Bollettino di Fitopatologia e di Entomologia Agraria*, Roma, 1927, n. 1, 23 pp., 15 figg.

[*Ophiobolus graminis* Sacc., *Oph. herpotrichus* (Fr.) Sacc., *Leptosphaeria herpotrichoides* De Not., *Fusarium* spp.]

Pfeffer, A. *Dermestes lardarius* als Schädling de Holzbauten. *Anzeiger für Schädlingskunde*, Berlin, 1927, III. Jahrg., Heft 6, S.67-96, Abb.1-5.

Poos, F. W. Biology of the European corn borer (*Pyrausta nubilalis* Hubn.) and two closely related species in Northern Idaho. *The Ohio Journal of Science*, Columbus, 1927, vol. XXVII, no. 2, pp. 47-88, fig. 1-3, pl. I-VI

[*P. nubilalis*, *P. amshae* Heinrich, *P. pennsylvanica* Grote]

Puecher Passavalli, LUIGI. Un altro lepidottero dannoso alla drupa dell'olivo (*Glyphodes unonialis* Gn.). *L'Italia Agricola*, Piacenza, 1927, anno 64, n. 7, pp. 356-359, figg. 1-4.

[In Italy (Tuscany)]

Ramme, WILLY. Die Dermapteren und Orthopteren Siziliens und Kretas. Mit kritischen Beiträgen und Revisionen aus den Gattungen *Hololampra* Sauss., *Acrometopa* Fieb., *Phokadotera* Br., *Platycleis* Fieb. u. a. *Eos*, Madrid, 1927, tomo III, cuaderno 2º, págs. 111-200, figs. 1-23, láms. V-IX.

Ravaz, L. Encore l'antracnose. Extension des attaques de mildiou. La maladie rouge. Un cas grave de rougeau. *Le Progrès Agricole et Viticole*, Montpellier, 1927, 44º année, tome LXXXVIII, nº 29, p. 53-59.

Ravaz, L. La maladie rouge (Tétranique). *Le Progrès Agricole et Viticole*, Montpellier, 1927, 44º année, nº 27, p. 3-5, 1 pl. en coul.

[*Tetranychus telarius*]

Ravaz, L. Le mildiou. *Le Progrès Agricole et Viticole*, Montpellier, 1927, 44º année, nº 27, p. 5-8.

[*Plasmopara viticola*]

Rives, LOUIS. Sur la fusariose ? du Seibel 4986. *Le Progrès Agricole et Viticole*, Montpellier, 1927, 44º année, nº 27, p. 8-9.

[*Fusarium viticolum*].

Rolet, A. La destruction du ver de l'olive. *La Vie Agricole et Rurale*, Paris, 1927, 16º année, t. XXX, nº 22, p. 346-349.

[*Dacus oleae*].

Rolet, A. Le ver de l'olive et sa destruction. *La Vie Agricole et Rurale*, Paris, 1927, 16º année, t. XXX, nº 21, p. 331-334, 1 fig.

[*Dacus oleae*].

Rosen, H. R. The control of cotton-wilt by the use of organic fertilizers. *Science*, Lancaster, Pa., 1927, vol LXXV, no 1695, pp. 616-617.

[*Fusarium vasinfectum*]

Ruggles, A G and Winter, J D Results of three years' experience in the control of mosaic in red raspberries in nurseries. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol 20, no. 3, pp 478-483.

Salmon, E S and Ware, W M The powdery mildew of flax. *The Gardeners' Chronicle*, London, 1927, vol LXXXII (third series), no 2115, pp 34-35, fig 17

[The fungus observed at Cambridge on *L. num ustulatum* belongs by its characteristics to the conidial form of *Erysiphe Polygami*]

Sarno, PASQUALE La fillossera viticola in Agro romano. *L'Agricoltore d'Italia*, Roma, 1927, anno VI, nuova ser., n 31, p 4

Schlumberger. Die wirtschaftliche Bedeutung des Kartoffelschorfes Ziele und Wege zu seiner Bekämpfung. *Illustrierte Landwirtschaftliche Zeitung*, Berlin, 1927, 47. Jahrg, Nr 10, S 131-132. Abb 106, 109, 110, 113

[*Adinomyces* spp]

Schlumberger. Saatenanerkennung und Pflanzenkrankheiten im Jahre 1926. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin, 1927, 7. Jahrg, Nr 7, S 61-62

Schlumberger. Ueber die Möglichkeit einer Versicherung gegen Schäden durch Pflanzenkrankheiten. *Illustrierte Landwirtschaftliche Zeitung*, Berlin, 1927, 47. Jahrg, Nr 6, S 75-77

Silvestri, F Contribuzione alla conoscenza degli Aleurodidae (Insecta Hemiptera) viventi su *Citrus* in Estremo Oriente e dei loro parassiti. *Bollettino del Laboratorio di Zoologia generale ed agraria del R. Istituto superiore agrario di Portici*, Spoleto, 1927, vol. XXI, pp. 1-60, figg. I-XXXIV.

[Description and information on the Aleurodidae species observed by the A on *Citrus Aleurocanthus spiniferus* (Quaint), *A. woglumi* Ashby, *A. incertus* n. sp., *A. citrifolius* Q et B, *Aleurolobus maritatus* (Q), *A. setigerus* Q et B, *A. subrotundus* n. sp., *Aleurocybotus setiferus* Q et B, *Bemisia giffardi* (Kotinsky), *Dialeurodes citri* (Ashm), *D. citrifolii* (Morgan)]

Description and biological notes on the Aleurodidae parasites living on *Citrus*. *Prospaltella smithi* Silv, *P. ishi* Silv, *P. diplois* n. sp, *P. opulenta* n. sp, *P. citrifolia* n. sp, *P. strenua* n. sp., *P. perstrenua* n. sp., *P. armata* n. sp., *Encarsia merceti* Silv, *E. merceti* Silv var *modesta* Silv, *E. nipponica* n. sp, *E. persequens* n. sp, *Eristomocerus serius* n. sp, *E. serius* Silv var *orientalis* n. var, *Ablerus macrochaeta* n. sp, *A. macrochaeta* Silv subsp *ingrueunda* n. var, *A. connectens* n. sp, *Amitus hesperidum* n. sp, *A. hesperidum* Silv subsp *varipes* n. var]

Sherbakoff, C D Powdery mildew of muskmelon. *Phytopathology*, Lancaster, Pa., 1927, vol 17, no. 6, pp 414-415

[The perfect form of the fungus observed in California has been found in Russia and determined as *Sphaerotheca fuliginea* (Schecht.) Pall]

Smith, KENNETH M Observations on the insect carriers of mosaic disease of the potato. *The Annals of Applied Biology*, London, 1927, vol XIV, no 1, pp 113-131, fig 1, pl VIII-X

[The transmission of "mosaic" by means of *Myzus persicae* and *Macrosiphum* ges (= *M. solani*/olus) has been experimentally achieved, no conclusive results have as yet been obtained with *Asterochloa vaporariorum*, *Zygnina paludis* fons and *Eupteryx auratus*]

Somerset. The gold-tail moth (*Porthea similis*, Fues). *The Gardeners' Chronicle*, London, 1927, vol LXXXII (third series), no 2116, pp 53-54.

Solberg, LOUISE Sur une Myxobactériacée parasite des racines de plantes supérieures. *Comptes rendus des séances de la Société de Biologie et de ses filiales*, Paris, 1927, tome XCVII, n° 24, p 555-556

[It is a case of a Microbacteriaceae closely related to *Polyangium* found, in Norway in the garden pea, *Aster sinensis* *Viola tricolor* and *La thyrus odoratus*]

Sorokin, HELFN Phenomena associated with the destruction of the chloroplasts in tomato mosaic. *Phytopathology*, Lancaster, Pa., 1927, vol 17, no 6, pp 363-379, pl XII-XV.

Speyer, W Von der Bekämpfung des Apfelsaugers an der Niederelbe. (Dritter Beitrag). *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin, 1927, 7. Jahrg., Nr. 7, S 63-64.

[*Psylla mali* Schmidt]

Stellwaag und Geissler. Eine neue praktische Arbeitsmethode mit Blausäure, die bei der Bekämpfung des Apfelblutenstechers (*Anthonomus pomorum* L.) angewandt wurde. *Anzei-*

ger für Schädlingskunde, Berlin, 1927, III. Jahrg., Heft 6, S. 63-67.

Stevens, F. L. and Young, P. A. On the use of the terms saprophyte and parasite. *Phytopathology*, Lancaster, Pa., 1927, vol. 17, no. 6, pp. 409-411.

Stockwell, C. W. The inspection of vehicular traffic as practiced in the enforcement of the Japanese Beetle Quarantine. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol. 20, no. 3, pp. 467-470.

[*Popillia japonica*].

Tempel, W. Die Kräuselkrankheit des Pfirsichs (*Exoascus deformans* Berk.) und ihre Bekämpfung. *Die kranke Pflanze*, Dresden, 1927, 4. Jahrg., Heft Nr. 6, S. 91-95, 1 Abb.

Thomas, F. L. The orange maggot. *Journal of Economic Entomology*, Geneva, N. Y., 1927, vol. 20, no. 3, p. 544.

[*Anastrepha ludens* Loew in Texas]

Thompson, W. R. et Parker, H. L. Etudes sur la biologie des insectes parasites la vie parasitaire et la notion morphologique de l'adaptation. *Annales de la Société Entomologique de France*, Paris, 1927, vol. XCVI, année 1927, 2^e trimestre, p. 113-146.

Thorpe, W. H. Phytophagic or biological races in insects. *Nature*, London, 1927, vol. 119, no. 2999, p. 602.

Toro, RAFAEL, A. Represión de las enfermedades de las plantas. *Revista de Agricultura de Puerto Rico*, San Juan, P. R., 1927, año X, vol. XVIII, núm. II, pags. 86-87.

Trappmann, WALTHER. Prüfung von Raupenleimen im Winter 1926/27. *Nachrichtenblatt für den Deutschen*

Pflanzenschutzdienst, Berlin, 1927, 7. Jahrg., Nr. 7, S. 62-63.

Tucker, C. M. Pigeon pea anthracnose. *Journal of Agricultural Research*, Washington, D. C., 1927, vol. 34, no. 6, pp. 589-596, fig. 1-3.

[*Colletotrichum Cajani* Rangel on *Cajan cajan* (L.) Millsp. = (*Cajanus indicus* Spreng.) in Porto Rico]

Ulbrich, H. Bisamrattenschäden in Sachsen. *Die kranke Pflanze*, Dresden, 1927, 4. Jahrg., Heft Nr. 6, S. 95-96.

[*Fiber subaeneus*]

Urbahns, F. D. The pear leaf blister mite. *Monthly Bulletin of the Department of Agriculture, State of California*, Sacramento, California, 1927, vol. XVI, no. 2, pp. 77-80, fig. 32

[*Eriophyes pyri* Pgst.]

Uvarov, B. P. Locusts and grasshoppers. A handbook for their study and control. Moscow-Leningrad, "Promizdat", 1927, 306 pp., 105 figs. Bibliography, pp. 295-305

[In Russian, with English title]

Vercier, J. Un nouveau piège lumineux phosphorescent. *Le Progrès Agricole et Viticole*, Montpellier, 1927, 44^e année, n^o 28, p. 44-45

Verplancke, G. De la valeur de la "Tuber testing method" dans la sélection sanitaire de la pomme de terre. *Annales de Gembloux*, Bruxelles, 1927, 33^e année, 9^{me} livraison, p. 309-315.

v. Appen, A. Die Kopfhornblattwespe, ein Korbweidenschädling. *Illustrierte Landwirtschaftliche Zeitung*, Berlin, 1927, 47. Jahrg., Nr. 12, S. 157.

[*Cimbex* sp. on *Salix viminalis*]

NOTES

An Entomological School ("Seminar") at Rostock, Germany. — Subsidized by the "Reichsministerium für Ernährung und Landwirtschaft" and by the Government of the Grand Duchy of Mecklenburg-Schwerin, an Entomological "Seminar" has been founded at Rostock. It is under the direction of Professors Dr. Paul SCHULZE and Dr. K. FRIEDERICHs.

STATISTICS

Crop estimates.

Cereals. — The two most important cereal exporters of the Southern Hemisphere, Argentina and Australia have published preliminary crop forecasts.

Argentina forecasts a record crop of wheat.

Australia has not modified the preliminary estimate made in October, which showed rather a poor crop, but reports that rain in October and November, generally improved the situation.

The following table shows the recent crop estimates compared with the production of previous years, and also the total quantities exported.

The aggregate production of the two countries is estimated at 8 % below last year's output and 5 % above the average for the previous five year period 1921 to 1925.

By adding the figures for Argentina and Australia to those for the Northern Hemisphere, the world production so far noted is shown by the

Wheat

(in thousand metric tons).

Years	Argentina Production (1)	Australia Production (1)	Total Production (1)	Total Exports (2)
1927	6,530	3,000	9,530	...
1926	6,010	4,878	10,888	(3) 6,548
1925	5,202	3,116	8,318	4,231
1924	5,202	4,479	9,681	8,408
1923	6,744	3,402	10,146	6,808
1922	5,330	2,979	8,309	5,435
1921	5,199	3,513	8,712	6,239
1920	4,249	3,970	8,219	4,984
1919	5,905	1,251	7,156	7,087
1918	4,904	2,059	6,962	6,366
1917	6,891	3,123	9,513	4,277
1916	2,289	4,148	6,438	2,794
1915	4,600	4,878	9,478	3,999
1914	4,604	677	5,281	2,715
1913	2,850	2,813	5,663	2,720
1912	5,100	2,503	7,603	4,415

(1) The figures refer to the harvest which took place at the end of the year indicated and at the beginning of the following year. (2)

(2) The figures include wheat and wheat flour expressed in terms of wheat, and refer to exports made the year following that indicated.

(3) The figures refer to exports made during the first ten months of 1927; corresponding figures for 1926 3,572,900 metric tons.

totals on the following page; which however do not included the U.S.S.R., China and a few other countries of secondary importance. The figures for maize refer only to countries of the Northern Hemisphere.

Production of cereals (1)

(in thousand metric tons)

Crop and countries	1927	1928	Average 1921-1925	Average 1909-1913
WHEAT				
Europe (25 countries)	88,870	82,550	82,080	86,790
Canada, U. S. A. and Mexico	88,130	84,100	82,350	24,450
Asia (5 countries)	10,650	10,370	10,540	10,600
Africa (7 countries)	8,000	2,700	2,700	2,740
Argentina	6,580	6,010	5,540	4,000
Australia	3,000	4,380	3,500	2,490
Totals (42 countries)	98,180	90,110	86,710	81,040
RYE				
Europe (23 countries)	20,450	18,680	19,490	24,800
Canada and U. S. A.	1,900	1,850	2,260	970
Argentina	190	80	80	20
Totals (26 countries)	22,540	20,600	21,800	25,650
BARLEY				
Europe (25 countries)	18,690	14,060	12,880	14,580
Canada and U. S. A.	7,920	6,270	5,850	5,010
Asia (4 countries)	2,700	3,050	2,810	2,680
Africa (7 countries)	2,070	1,560	2,020	2,280
Argentina	870	400	220	40
Totals (39 countries)	26,750	25,380	23,780	24,580
OATS				
Europe (24 countries)	24,540	25,180	21,690	25,860
Canada and U. S. A.	24,320	24,050	26,540	22,020
Africa (4 countries)	370	310	330	400
Argentina	940	960	860	790
Totals (31 countries)	50,170	50,500	49,420	49,070
MAIZE				
Europe (10 countries)	11,740	16,800	12,180	14,680
Canada and U. S. A.	70,890	67,480	72,750	68,340
Africa (4 countries)	280	220	210	200
Totals (16 countries)	82,890	84,500	85,140	84,170

(1) The figures for countries in the Northern Hemisphere refer to harvests at the end of the year indicated and at the beginning of the following year.

The total production of the various cereals in 1927 compared with last year and the averages for the periods 1921-25 and 1909-13 give the following percentages :

Percentages of the 1927 production compared with that of 1926 and with the averages shown.

	1926 = 100	Average 1921 to 1925 = 100	Average 1909 to 1913 = 100
Wheat (42 countries)	108.4	107.5	115.0
Rye (26 ")	112.4	108.4	87.9
Barley (39 ")	105.6	112.2	109.1
Oats (31 ")	99.8	101.5	102.2
Maise (16 ")	98.7	97.4	98.5

In regard to the present winter cereal crop conditions were on the whole favourable in Europe, as the weather was generally mild and fine during the first ten days of November, followed by heavy rain and a drop in temperature during the second ten days ending with warmer weather during the last ten days of the month. The condition of the seedlings was almost everywhere satisfactory, although in some countries they were more backward than usual.

The condition of winter cereals in the United States was good, except in the west and southwest of the winter wheat belt where the weather was still too dry.

There was heavy rain in North Africa during November.

Potatoes. — The following table shows the aggregate potato production in the Northern Hemisphere. The figures (not including those for

Production of potatoes

(in million metric tons).

Countries	1927	1926	Average 1921 to 1925	Average 1909 to 1913
Europe (21 countries)	119.8	98.4	104.9	108.5
Canada and U. S. A.	18.1	11.9	13.3	11.9
Totals (23 countries)	137.9	110.3	118.2	120.4

the U.S.S.R. and a few countries of minor importance) represent about $\frac{2}{3}$ of the world's production. The slight amendments and a new estimate from Italy which arrived in December have not modified the opinion expressed last month as to the abundance of this year's crop.

Sugar beet and beet sugar. — The figures for sugar beet production in England, Wales and Rumania arrived after publication of the November Bulletin Production in England and Wales increased 60 % over that of 1926 which was due more to a large increase in area than to the weather, while in Roumania in spite of a larger area than last year there was a decrease of 15 % in production.

Production of sugar-beet

(in million metric tons).

Countries	1927	1926	Average 1921/25	Average 1909/13
Europe, not including U. S. S. R. (16 countries). .	40.1	36.1	31.9	31.5
U. S. S. R.	9.9	6.2	3.4	9.9
Canada and U. S. A.	7.4	7.0	6.6	4.6
Totals (19 countries)	57.4	49.3	41.9	46.0

Taking into account the total of the figures so far noted which represent $\frac{9}{10}$ of the world production of sugar beet the 1927 production is 16.3 % higher than that of 1926, and 36.9 % higher than the previous five year's average.

Production of Beet Sugar

(in thousand metric tons)

Countries	1927-28	1926-27	Average 1921-25 to 1925-26	Average 1909-10 to 1913-14
Europe not including U. S. S. R.	6,524.0	5,808.5	5,253.4	6,224.2
U. S. S. R.	1,242.1	801.6	411.7	1,434.8
United States	1,092.7	924.7	933.9	628.5
Totals	8,858.8	7,519.8	6,599.0	8,287.5

Estimates sent to the Institute by governments and in some cases by Sugar Manufacturing Associations are now complete for the whole of Eu-

rope. Their totals show that the probable European production for the 1927-28 season will be 16.0 % higher than the 1926-27 season, 37.1 % higher than the previous five year average and about equal to the pre-war average.

By adding the United States production to that of Europe (which is practically the world output of beet sugar) the production of the present season is shown to be 16.3 % higher than that of last season, 34.2 % higher than the previous season and 5 6 % higher than the pre-war average.

Linseed. — According to available figures which include all the principal linseed growing countries, the area sown to this crop last season was equal to that of the previous season: the decreases shown in Canada and India, being compensated for by increases in the United States, Argentina and the U.S.S.R. The area under linseed this year is about $\frac{1}{5}$ higher than the average for the five years 1921-25 and higher still in comparison with the average 1909-1913.

Production of Linseed

(in thousand metric tons).

Countries	1927	1926	Average 1921 to 1925	Average 1909 to 1913
Europe (10 countries)	180	170	140	150
Canada and U. S. A	800	620	680	800
British India	410	410	440	500
Africa (2 countries)	10	10	10	10
Argentina	2,160	1,780	1,880	790
Totals (16 countries)	3,540	2,970	2,550	2,250

In regard to production, precise figures are lacking as to the harvest obtained in the U.S.S.R. However it seems that, the average yield in this important producing country, is slightly above last year's. For other countries, the figures are practically complete, now that the first estimate of Argentina has been published.

The world production of 1927 so far noted shows an increase of 19 % over that of last year and 39 % and 57 % respectively over the averages for the periods 1921-25 and 1909-1913. The above increase is largely due to the good U.S.A. crop and more so to the record crop in Argentina this year. An idea of the probable exports during 1928 can be obtained from the following table, which shows the production, exports, and percentage

of exports to production, for the three principal linseed exporting countries (Argentina, India and Canada).

Aggregate production and exports of Linseed for Argentina, India and Canada

(in thousand metric tons).

Years	Production (1)	Exports (2)	Percentage (3)
1927	2,693 8	(4) ...	...
1926	2,314 6	1,833 6	..
1925	2,653 2	1,929 9	72 7
1924	1,861 9	1,462 3	78.5
1923	2,196 4	1,761 9	80 3
1922	1,778 7	1,479 8	83 2
1921	1,294 4	1,300 3	100 5
1920	2,153 1	1,558 7	72 4
1919	1,645 1	1,300 2	79 0
1918	1,458 7	1,224 2	83 9
1917	1,182 8	669 7	56 6
1916	795 8	475 6	59 8
1915	1,453 8	1,157 7	79 6
1914	1,718 8	1,215 0	70 7
1913	1,934 3	1,400 9	72 4
1912	2,449 0	1,972 7	80 6
1911	1,408 8	1,082 2	76 8
1910	1,137 5	972 6	85 5
1909	1,075 3	1,038 5	96 6

(1) Production of the year mentioned. The yields in Argentina are those secured at the end of the year mentioned and at the beginning of the following year

(2) Exports during the year following on that mentioned

(3) Percentage of exports as compared with production

(4) Exports for the first ten months of 1927, during the same period in 1926 there were exported 1,682,300 metric tons

The total production of the three countries under consideration is 16 % higher than their 1926 production and beats by a slight margin the record crop of 1925. On the other hand it would seem that the demand will be less, especially in the United States, where the 1927 production was 200,000 metric tons higher than that of 1926.

In regard to the U.S.S.R. exports for the last five fiscal years were as follows :—

Fiscal Years (1st. Oct. to 30 Sept.)	metric tons
1926-27	29,063
1925-26	44,458
1924-25	44,938
1923-24	14,793
1922-23	875

Before the war, Russia exported an average of about 140,000 metric tons of linseed, but this figure also comprises the exports of territories which to day no longer form part of the U.S.S.R. By adding to the exports of the U.S.S.R. those of the new states to whom the aforesaid territories have passed it is calculated that about $\frac{3}{4}$ of the pre-war Russian exportation was reached in 1926.

Cotton. — The last cotton report of the United States Department of Agriculture, only slightly modified the previous November estimate. Therefore production for the present season will be considerably below last year's, owing to a decrease in acreage and an unfavourable season which greatly reduce the yield. There was however an increase of 11 % over the average for the seasons 1921-22 to 1925-26.

According to the latest estimate, also in Egypt, owing to a reduction in acreage, production was poor.

The complete data for India will be available towards the end of the month, but also in this country there has been a decrease in acreage. The reduction is estimated at about 7 % in comparison with last season's area on the basis of the second report of the sowings made up to the 1st October. The two provinces of Punjab and Madras which produce roughly about $\frac{1}{5}$ the total Indian cotton crop, have published their estimates which together amount to 175,000 metric tons as compared with 167,300 metric tons in 1926-27 and 178,800 metric tons for the average of the previous five years.

Slight decreases compared with last year are also shown by almost all the other countries for whom data are available, the most important of them being Korea and the Anglo-Egyptian Sudan.

The aggregate production so far noted which is summarized in the following table and which represents about $\frac{2}{3}$ of the world production shows a decrease of 26 % in comparison with last season and an increase of 9 % over the average for the seasons 1921-22 to 1925-26.

Production of Cotton

(in thousand metric tons).

Countries	1927-28	1926-27	Average 1921-22 to 1925-26
United States	2,770	3,900	2,500
Egypt	270	320	300
Other country (5 countries)	240	280	220
Total (7 countries)	3,280	4,480	3,020

Hemp. — The available figures for hemp production are still incomplete as the estimates for the 1927 harvests are lacking not only for several producing countries of minor importance, but also for the U S S R. which is the principal producer of hemp.

The following table shows the aggregate production of the six countries for whom data are available (Austria, Bulgaria, France, Italy, Poland and Czechoslovakia) which in 1926 furnished about $\frac{1}{3}$ of the total European production, excluding the U S S R.

	thousand lbs
1927	274,036
1926	374,346
Average 1921-1925	256,619
Average 1909-1913	275,138

In comparison with last year there was a decrease of about $\frac{1}{4}$ principally due to Italy where there was a drop both in yield and acreage. However, as will be seen by the table the production is still above the average for the period 1921-25 and practically the same as the pre-war average.

International Trade. SURPLUS QUANTITY OF IMPORTS (+) OR OF EXPORTS (—)

Countries	Wheat		Wheat flour		Rye		Barley		Oats	
	(August 1-Sept. 30)	1926	(August 1-Sept. 30)	1926	(August 1-Sept. 30)	1926	(August 1-Sept. 30)	1926	(August 1-Sept. 30)	1926
	metric tons	1927	metric tons	1927	metric tons	1927	metric tons	1927	metric tons	1927
Germany	371,601	406,121	4,199	15,734	64,536	47,041	254,825	303,119	55,981	74,874
Austria	43,658	63,375	26,537	17,261	17,261	24,832	4,968	12,280	14,700	17,525
Belgium	200,576	106,994	750	4,711	17,633	28,561	38,444	28,561	12,688	14,692
Denmark	18,437	14,049	8,511	16,815	487	8,556	487	8,556	2,733	985
Spain	3,343	883	1,040	2,204	10,739	717	650	717	50	336
Estonia	11	16,296	16,489	8,533	10,133	0	0	0	76	628
Finland	404,165	139,130	1,377	4,253	180,679	156,364	3,144	2,883	11,806	8,001
Gr. Brit. and North. Ireland	1,630,494	973,193	59,747	4,253	16,400	10,354	180,679	156,364	51,068	67,222
Hungary	106,184	139,265	45,275	24,402	73,503	10,354	16,400	10,354	5,078	1,819
Irish Free State	42,967	47,412	25,547	23,543	68	23	16,400	10,354	5,078	1,819
Italy	132,252	192,632	3,388	3,304	3,621	2,065	2,065	1,172	28,089	16,390
Latvia	5,750	8,294	0	3,204	4,848	6,204	3,609	245	2,067	304
Lithuania	2	76	0	0	1,181	824	824	157	8	104
Norway	16,696	12,138	13,018	6,561	10,329	25,594	6,381	6,572	5,028	4,445
Netherlands	101,776	123,925	21,682	30,592	16,290	13,610	43,707	53,129	11,865	13,838
Poland	3,746	8,342	7,722	730	9,868	45,082	7,713	20,213	14,867	3,185
Rumania	72,742	89,787	10,763	17,633	23,100	9,677	281,971	207,080	14,867	8,933
Kingdom of the Ser., Cr. and Slov.	45,485	49,784	1,482	8,195	12,183	6,436	606	5,944	3,595	4,164
Sweden	45,485	28,223	1,184	381	13,243	6,436	606	5,944	3,595	4,164
Switzerland	74,762	89,393	—	—	535	46	17,750	10,047	28,626	31,635
Czechoslovakia	65,054	57,651	28,411	15,112	10,838	29,943	29,943	5,944	0,180	2,149
U. S. R.	19,830	144,122	—	—	37,560	36,748	25,448	134,721	5,087	0
Canada	714,149	1,315,190	104,977	94,541	27,079	18,690	36,376	100,864	3,000	22,489
United States	1,512,459	1,370,124	207,401	250,763	228,572	61,871	233,013	91,252	20,133	16,919
Argentina	273,052	98,109	25,690	21,554	5,279	9,661	6,331	7,931	38,956	39,373
Chile	—	17	67	238	—	—	0	10,224	56	4,027
Ceylon	13	13	3,456	3,994	—	—	49	49	132	208
India	44,893	80,020	8,022	10,276	—	—	13,101	1,665	72	143
Indochina	—	—	3,856	3,759	—	—	—	—	—	—
Japan	39,130	41,270	12,534	19,504	—	—	0	0	2	802
Syria and Lebanon	3,030	4,454	2,608	3,779	—	—	7,851	1,235	—	—
Algeria	19,732	28,766	893	1,076	636	143	35,891	924	990	818
Egypt	2,495	2,729	22,340	28,543	—	—	35,891	5,310	—	—
Tunis	7,643	15,735	318	4,541	—	—	10,573	24,305	421	7,356
Union of South Africa	26,947	9,927	3,870	3,927	—	—	2	0	82	207
Australia	113,735	13,222	79,296	62,037	—	—	5,167	3,978	1,468	182
New Zealand	37	11,011	1,488	9,724	—	—	1,367	30	8,746	115
Total of imports	2,669,272	2,495,628	230,510	254,412	211,650	209,760	562,202	580,481	227,878	247,486
Total of exports	2,987,738	3,309,169	607,977	638,782	348,083	263,831	734,129	646,751	120,086	119,718

(1) One month only.

SURPLUS QUANTITY OF IMPORTS (+) OR OF EXPORTS (—)

Countries	Maize		Lusced		Rice		Tea		Coffee	
	(November 1-Sept. 30)	1925-26	(January 1-Sept. 30)	1927	(January 1-Sept. 30)	1927	(July 1-Sept. 30)	1927	(July 1-Sept. 30)	
Germany	1,843,405	524,903	282,753	254,085	208,436	117,749	1,511	1,394	30,200	30,685
Austria	202,576	178,386	215	169	19,267	55,054	100	150	10,176	7,180
Hungary	220,778	220,778	64,028	67,132	32,532	68	68	150	10,176	7,180
Denmark	70,604	351,160	11,002	20,085	26,835	24	99	184	6,077	6,381
Spain	...	...	...	...	...	...	...	...	...	...
Estonia	0	296	665	301	1,466	1,725	19	35	38	41
Finland	3,567	2,255	3,751	5,587	11,175	125,063	16	19	4,441	3,967
France	715,726	545,679	125,206	125,206	111,175	125,063	39	29	4,441	3,967
Gr. Brit. and North. Ireland	1,762,233	1,455,436	235,443	292,947	90,868	76,767	245	429	36,472	42,169
Hungary	40,189	190,644	2,191	1,903	19,734	16,995	94	54	911	802
Finland Free State	344,389	287,584	414	680	1,810	1,620	2,419	2,202	47	40
Italy	334,951	476,714	57,269	45,026	164,900	120,319	23	34	11,574	10,804
Latvia	102	151	646	5,273	1,793	1,805	22	25	37	59
Lithuania	139,698	109,843	8,072	5,516	1,919	1,914	14	35	4,365	4,365
Poland	1,260,610	570,417	255,682	270,227	85,116	119,024	14	35	4,365	4,365
Netherlands	122,809	15,482	9,517	8,700	52,647	21,929	8,018	8,018	1,903	1,903
Rumania	1,685,555	605,473	2,568	1,724	0	16,976	489	417	0	483
Kingdom of the Ser., Cr. and Slov.	322,794	903,415	3,196	16,429	14,533	14,533	86	78	10,557	14,882
Sweden	145,218	100,169	30,743	85,751	5,202	5,808	176	166	2,719	2,788
Switzerland	119,091	125,370	15	14,127	10,800	10,800	159	96	3,092	2,163
Czechoslovakia	372,094	321,867	17,336	15,315	40,189	36,981	159	96	3,092	2,163
U. S. S. R.	148,812	210,801	...	...	...	...	...	...	...	...
Canada	393,304	243,295	98,957	31,607	13,763	19,907	4,410	3,972	2,349	1,966
United States	287,651	504,386	445,626	402,363	89,563	27,111	11,349	14,047	145,536	154,068
Argentina	7,521,491	3,857,892	1,439,456	1,384,704	...	...	...	...	234,720	229,302
Brazil	...	...	...	...	...	...	...	...	928	713
Chile	...	...	...	...	...	...	...	...	...	...
Ceylon	...	...	...	...	...	...	...	...	...	...
India	51	124	154,197	130,674	397,985	362,538	23,406	24,701	468	496
Dutch East Indies	34,079	43,966	...	...	1,943,659	2,065,732	53,847	58,133	137	137
Indochina	61,061	38,619	...	...	64,281	232,961	13,063	10,047	16,241	10,896
Japan	32,497	21,519	5,802	5,737	1,204,251	1,203,067	460	331	...	...
Siam and Lebanon	3,788	1,313	...	...	613,852	226,312	6,117	6,261	374	340
Alemania	11,538	2,191	32	43	4,678	2,474	106	106	160	112
Egypt	12,137	8,709	81	86	8,209	9,127	1,010	1,805	2,357	1,905
Tunis	11,046	4,102	703	567	817	670	245	274	2,990	2,436
Union of South Africa	87,746	382,537	...	...	33,969	29,113		1,096	4,676	3,510
Australia	15,554	53,706	15,842	17,613	16,667	6,069	4,765	5,868	410	249
New Zealand	2,611	4,882	248	942	2,606	2,486	1,578	1,734	101	89
Total of imports	9,277,197	6,231,553	1,686,765	1,857,928	1,712,968	1,625,902	81,106	81,089	304,426	307,288
Total of exports	10,205,354	6,835,577	1,044,538	1,544,988	3,437,477	3,425,066	96,135	99,142	249,961	239,038

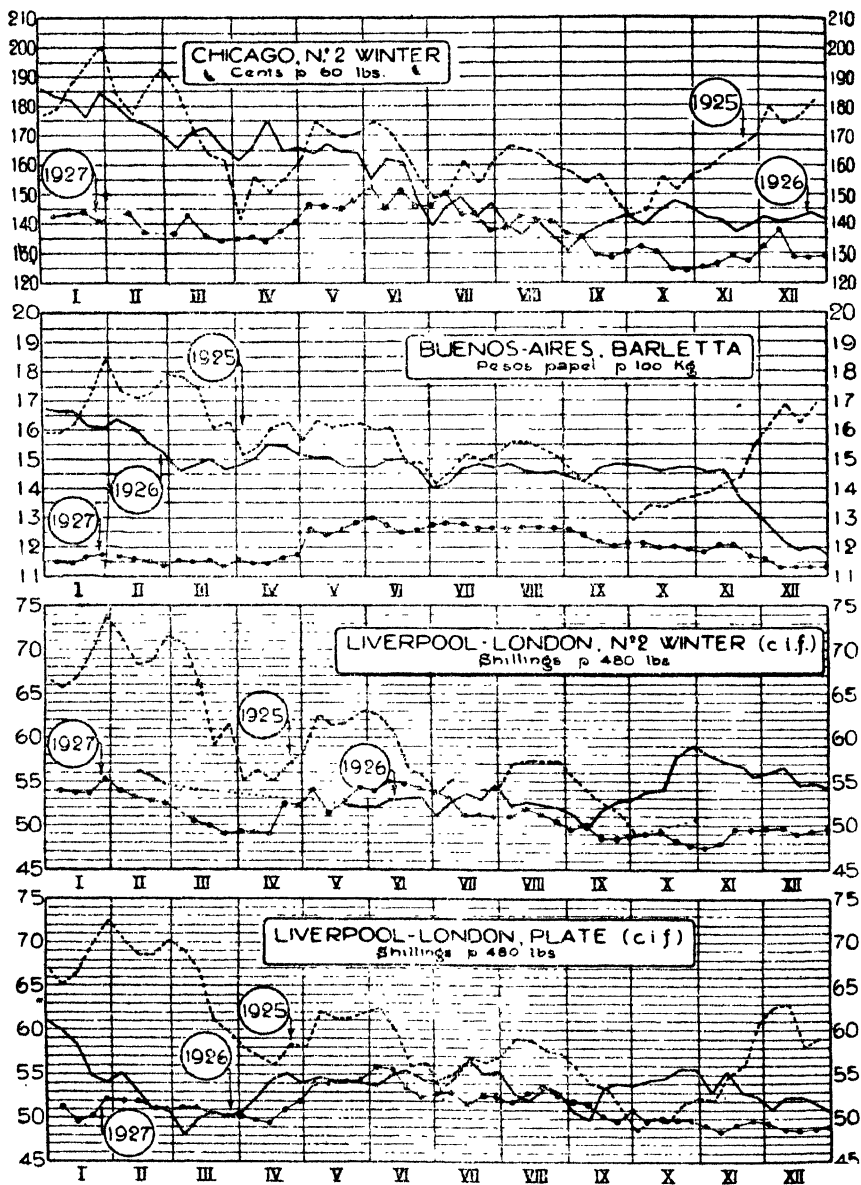
(1) Six months. --- (2) Two months --- (3) Eight months

SURPLUS QUANTITY OF IMPORTS (+) OR OF EXPORTS (—)

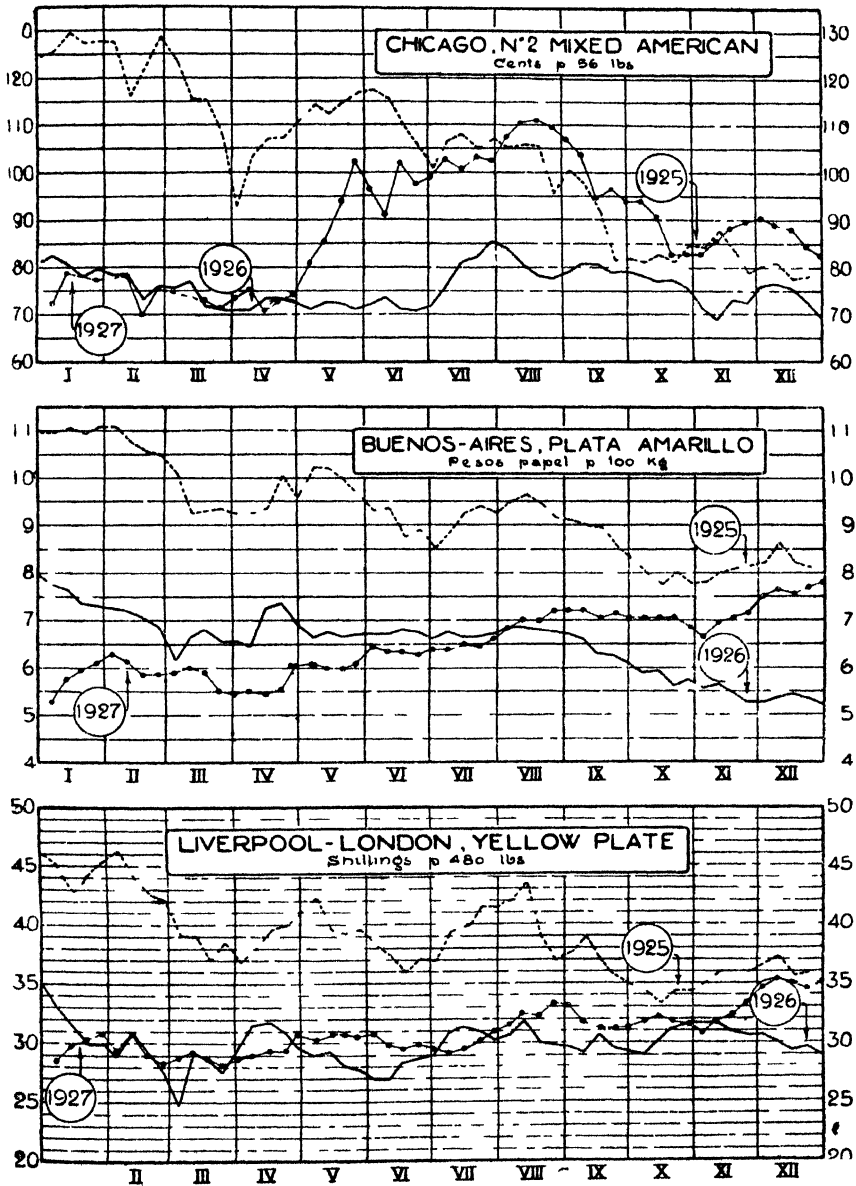
Countries	Butter			Lard			Cotton			Wool		
	1927	1926	(January 1-Sept. 30)	1927	1926	(January 1-Sept. 30)	1927	1926	(August 1-Sept. 30)	1927	1926	(September)
	metric tons	metric tons	metric tons	metric tons	metric tons	metric tons	metric tons	metric tons	metric tons	metric tons	metric tons	metric tons
Germany	78,846	71,844	+	53,939	46,096	+	35,599	34,855	+	6,538	+	8,648
Austria	1,599	1,529	+	2,329	2,399	+	5,030	2,939	+	2,939	+	2,939
Belgium	42	1,306	+	12,059	10,987	+	13,094	11,965	+	2,401	+	2,928
Denmark	109,126	101,010	+	3,721	5,183	+	722	972	+	247	+	171
Estonia	—	—	—	—	—	—	—	—	—	—	—	—
Finland	—	—	—	—	—	—	—	—	—	—	—	—
France	—	—	—	—	—	—	—	—	—	—	—	—
Great Britain and Northern Ireland	—	—	—	—	—	—	—	—	—	—	—	—
Hungary	—	—	—	—	—	—	—	—	—	—	—	—
Irish Free State	—	—	—	—	—	—	—	—	—	—	—	—
Italy	—	—	—	—	—	—	—	—	—	—	—	—
Latvia	—	—	—	—	—	—	—	—	—	—	—	—
Lithuania	—	—	—	—	—	—	—	—	—	—	—	—
Norway	—	—	—	—	—	—	—	—	—	—	—	—
Netherlands	—	—	—	—	—	—	—	—	—	—	—	—
Poland	—	—	—	—	—	—	—	—	—	—	—	—
Kingdom of the Serbs, Croats and Slovenes	—	—	—	—	—	—	—	—	—	—	—	—
Sweden	—	—	—	—	—	—	—	—	—	—	—	—
Switzerland	—	—	—	—	—	—	—	—	—	—	—	—
Czechoslovakia	—	—	—	—	—	—	—	—	—	—	—	—
U. S. S. R.	—	—	—	—	—	—	—	—	—	—	—	—
Canada	—	—	—	—	—	—	—	—	—	—	—	—
United States	—	—	—	—	—	—	—	—	—	—	—	—
Argentina	—	—	—	—	—	—	—	—	—	—	—	—
Cuba	—	—	—	—	—	—	—	—	—	—	—	—
Ceylon	—	—	—	—	—	—	—	—	—	—	—	—
India	—	—	—	—	—	—	—	—	—	—	—	—
Japan	—	—	—	—	—	—	—	—	—	—	—	—
Syria and Lebanon	—	—	—	—	—	—	—	—	—	—	—	—
Algeria	—	—	—	—	—	—	—	—	—	—	—	—
Tunisia	—	—	—	—	—	—	—	—	—	—	—	—
Union of South Africa	—	—	—	—	—	—	—	—	—	—	—	—
Australia	—	—	—	—	—	—	—	—	—	—	—	—
New Zealand	—	—	—	—	—	—	—	—	—	—	—	—
Total of imports	319,171	308,315	+	217,954	204,796	+	280,496	305,565	+	41,239	+	36,873
Total of exports	325,273	307,943	—	216,727	205,875	—	312,219	392,759	—	39,891	—	41,763

(1) Six months.

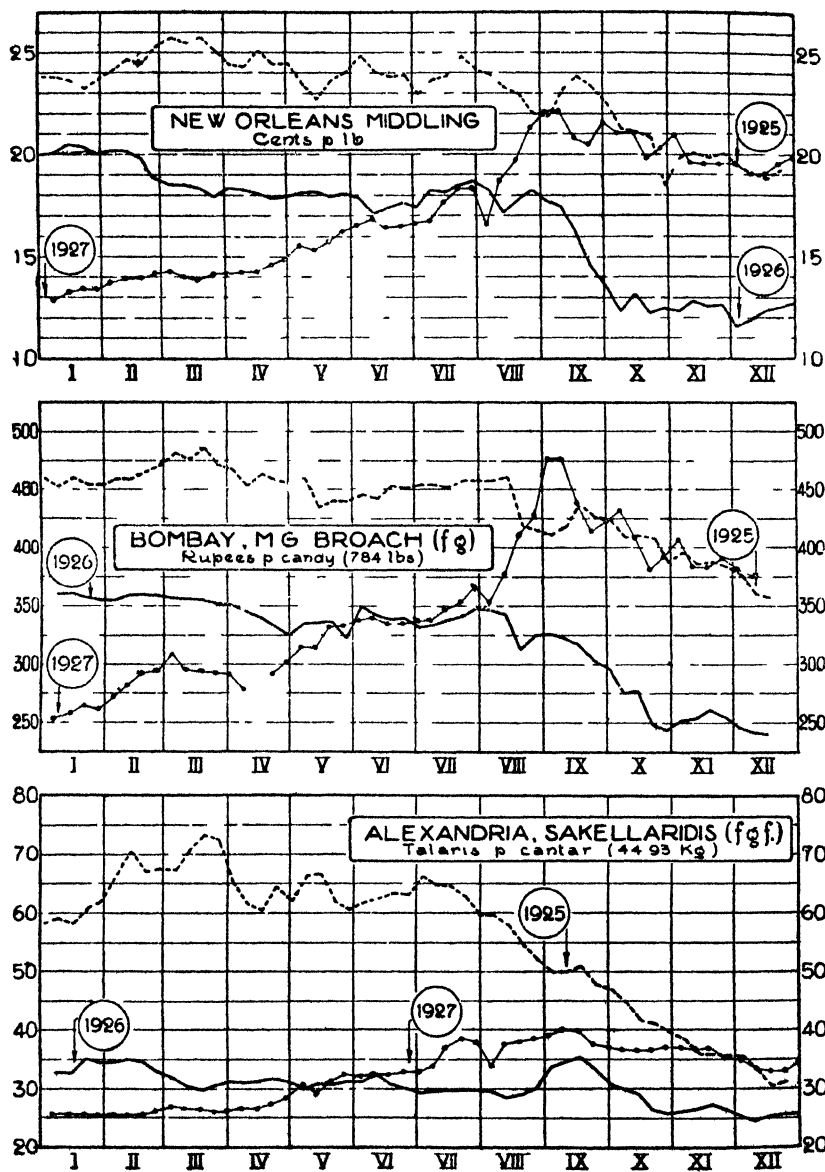
Prices of Wheat.



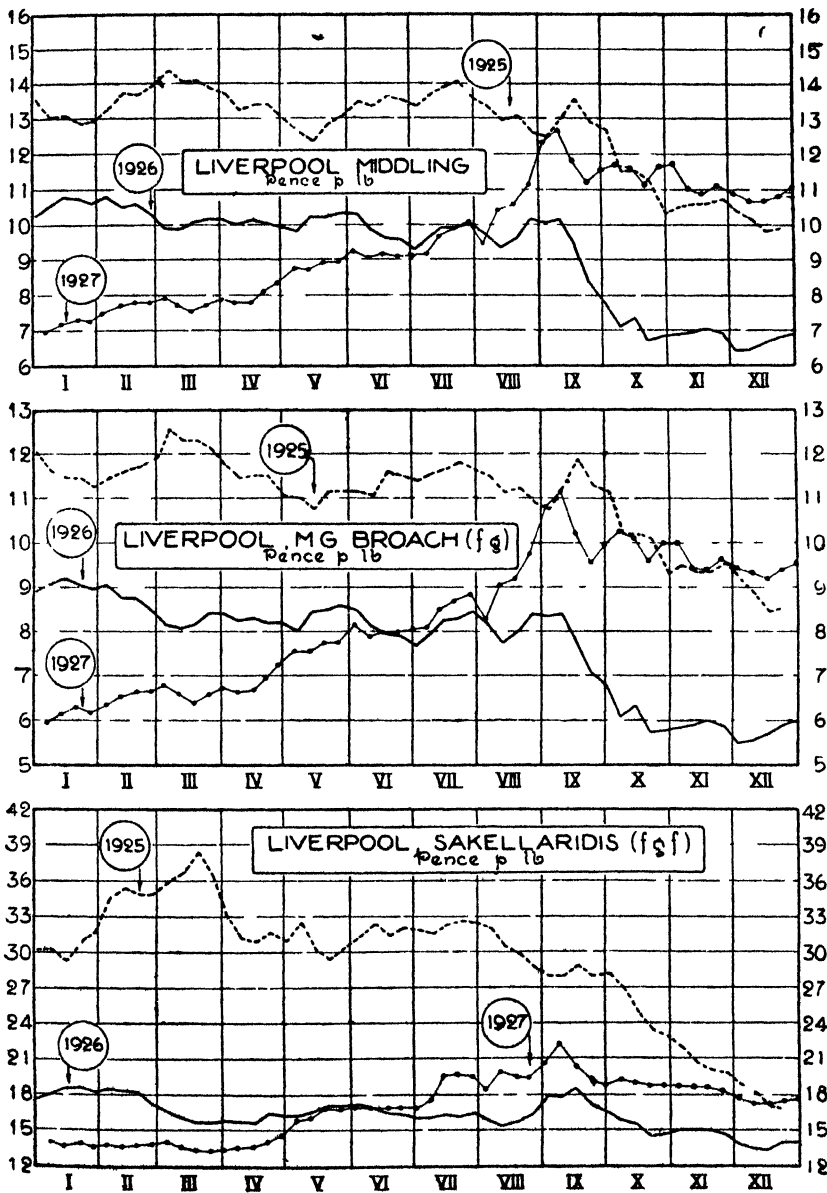
Prices of Maize.



Prices of Cotton.



Prices of Cotton.



AGRICULTURAL LEGISLATION

I. — FINANCIAL AND CUSTOMS LEGISLATION.

Spain. — A Royal Order No 1407 of 28 October 1927 (*Gaceta de Madrid*, No. 302, of 29 October 1927) authorizes until 15 December 1927 the importation free from customs dues of seeds for the cultivation of early potatoes of the "Royal Kidney" and "King Edward" variety with a view to facilitating the exportation of early potatoes. Importation is allowed on presentation of the sanitary certificate and guarantee that the potatoes so imported are employed for sowing only, and under no circumstances for consumption.

Regency of Tunis. — A Decree of 15 October 1927 (*Journal Officiel Tunisien*, No. 88, of 2 November 1927) suspends the prohibitions on export issued by the Decrees of 10 August and 12 September 1919, on phosphates of natural chalks and slags,

South Australia. — An Act (No. 1787 of 13 October 1927) consolidates certain acts relating to taxes on land, on incomes from real and personal property, etc. The Act specifies what lands are subject to taxation, the rates of such taxes, and the provisions to be applied to additional and absentee land taxes. It also lays down the procedure for the collection of taxes; assessment for the purposes of the land tax is made every five years, and power is given the fiscal authorities to inspect rate books and other documents. The land tax may be recovered by ordinary process, by distress, by letting or sale of land and by transfer to the Crown

Italy (Aegean Islands). — A Decree of 5 October 1927 (*Il Messaggero di Rodi*, No. 232 of 9 October 1927) contains provisions exempting certain articles from customs dues. In pursuance of this Decree exemption from importation dues is granted to vegetable carbon, fertilizers and anticryptogamic substances, fresh milk, firewood, agricultural, machines and implements, fresh fish, olive residues, eggs, etc.

Switzerland (Confederation). — A Federal Order of 30 September 1927 (*Recueil des Lois Fédérales*, No. 19 of 5 October 1927) establishes supplementary dues on barley, malt and beer. On malt intended for the manufacture of beer, in addition to the duty specified in No. 15 of the Tariff of the Swiss Customs, is payable a supplementary duty of 12 francs per 100 kg. of raw weight. On Barley, as well as other cereals and vegetables, used also in the preparation of malt and beer, is payable a supplementary duty of 8.85 francs per 100 kg. of raw weight. In respect of imported beer there must be paid on its introduction into Switzerland, a supplementary duty of 2.18 fr. per hectolitre.

II. — PLANT PRODUCTION. INDUSTRY IN PLANT PRODUCTS.

Egypt. — An Order of 21 September 1927 (*Journal Officiel du Gouvernement Egyptien*, No. 80 of 22 September 1927) with the object of attaining annual gradation in the selection of seed intended for sowing and of diminishing gradually, from one year to another, the proportion of foreign and Indian seed authorized for cotton sowing, prohibits the use, during any season whatsoever cotton seeds obtained from a previous season, unless examined afresh by the Ministry and unless their degree of selection is in conformity with the proportion required for that season.

Mexico. The Regulations for the Forestry Law (1) of 8 October 1927 were published in the *Diario Oficial* No. 34 of 13 October 1927.

Chapter 1 of the Regulations deals with the inalienability and imprescriptibility of forest reserves, Chapt. 2 with their exploitation and management. The management and exploitation of products of the forest reserves can only be effected by means of permits and concessions granted by the Ministry of Agriculture and Fomento according to the terms of Chapt. 2 of these Regulations. The Government may by Decree grant individuals permits or concessions for utilization or exploitation after the Secretariat of Agriculture has carried out a technical survey of the region, and in this manner ascertained that the exploitation or concession is not harmful to the land, water springs and courses or any other natural wealth existing in the reserves, the quantity and quality of the products derived from the exploitation and the natural and economic possibility of forest preservation and repopulation. The grantee of the concession is subjected to certain conditions specified in the Regulations. In no case may such permit or concession be granted for a period exceeding 20 years.

The concessions are granted as a result of public auction.

The Regulations also contain detailed provisions with respect to the exploitation of pasture grounds belonging to the Nation, national parks, communal and municipal forestry lands, forest plantation in private lands and parks, roads and other public places, transport of forest products, zones of forest defence and protection, forest repopulation, the establishment of regional forest nurseries, the cutting and preservation of timber, forest fires, forest registration, the organization of the federal forest service, forestry school, etc., etc.

Paraguay. — A Decree No. 27,926 of 13 September 1927 (*Diario Oficial*, No. 1433 of 15 September 1927) with a view to ensuring for the forthcoming agricultural season the quantity of first class cotton grains necessary for sowings, lays down that speculators in and exporters of cotton seeds are required to reserve for the country for agricultural purposes 15 % of the seeds bought by them, until the requirements of the national cotton cultivation are safeguarded. The Customs offices of the Republic shall only allow exportation on production of a certificate of the General Department of Agriculture proving that this provision has been fulfilled.

Switzerland (Confederation). — A Federal Order of 13 October 1927 (*Re-*

(1) See *International yearbook of Agricultural Legislation* 1926, p. 204.

cueil des Lois Fédérales, No. 21 of 26 October 1927) with a view to ensuring the utilization of unsold cider and fruits harvested in 1927, lays down special measures respecting the conditions of the loans to be granted by the Federal system respecting alcohols, rate of interest, content in alcohol, etc.

III. — AGRICULTURAL ORGANIZATION AND AGRICULTURAL INSTRUCTION.

Chile. — A Decree No. 1,485 of 22 September 1927 (*Diario Oficial*, No. 14,890 of 6 October 1927) founds a Higher Horsebreeding Council for the purpose of improving the national horse breeds and studying and proposing to the Government legislative measures of protection with the object of exercising effective action to meet the remarkable crisis in the number of horses, which decreased from 3,700,000 head in 1915 to 200,000 according to the latest census.

Colombia. — A Decree No. 1603 of 23 September 1927 (*Diario Oficial*, No. 20,607 of 29 September 1927) founds the national agricultural meteorological service, in pursuance of Law No. 71 of 1916, authorizing the Government to regulate the national meteorological services and appoint the staff responsible for making the observations. In view of the necessities and importance of this service there had already been founded by Decree No. 945 of 1927 at the National Department of Agriculture a Section for Agricultural Meteorology. The present Order requires the Chiefs of the Telegraphic Offices designated by the same Department, to make meteorological observations and forward them daily at 7 a. m. to the Section of Agricultural Meteorology in accordance with instructions received by them from the Department. A special compensation is allowed by the Ministry of Industries to Chiefs of Telegraphic Offices making such observations.

The Section of Agricultural Meteorology shall utilize, classify and keep the data obtained by its observers, for the study of the climatic conditions of the country, publishing information on the weather whenever it deems proper and circumstances allow, it shall also draw up instructions for the working of the service.

Spain. — A Royal Decree of 19 November 1927 (*Gaceta de Madrid*, No. 324 of 20 November 1927) founds and establishes at Valencia the National Rice-Cultivation Consortium, membership of which is compulsory for all rice cultivators, owners of rice fields, persons preparing rice, and merchants exporting rice from the provinces of Valencia, Castellón, Alicante, and Tarragona. Membership is also open to cultivators and other persons interested in the production of, and trade in, rice of other provinces where rice is cultivated, if the majority make application in this sense and the Consortium agrees. The Consortium shall be administered by a Central Junta, formed of an official element and by representatives of the various rice-cultivation regions and sectors concerned in the production and preparation of, and trade in rice.

The relations between the Government and the Central Junta are assured by means of a Higher Rice-cultivation Committee, set up within the Council of National Economy. In each rice cultivating region the Rice Cultivation Chambers and the Local Associations of Producers already in existence or which may be constituted later, shall lend their assistance for attaining the purposes of the Consortium.

The Rice Cultivation Consortium has the following attributions and objects :—

- (a) establish a just and equitable relation between the different factors which determine the cost of production ;
- (b) encourage the increase in rice consumption in the interior ;
- (c) harmonize foreign orders with the requirements of home consumption ;
- (d) develop and encourage co-operative organs and the co-operative spirit as regards production and trade ;
- (e) stimulate studies with the object of improving cultivation ,
- (f) see to the good name of the product in national and foreign markets ;
- (g) avoid illicit speculations ;
- (h) supply advances on funds and organize other forms of credit in favour of the members for facilitating rice production and trade ;
- (i) draw up the necessary statistics in order to realize the objects specified above

The economic resources of the Consortium are formed by means of an admission fee payable once only by members of the consortium, by a maximum charge of 2 pesetas 50 cm per metric quintal of prepared rice, by a small annual contribution, to be fixed by the Central Junta, and by the amount of the transport tax payable in respect of exported rice which the Treasury shall place at the disposal of the Central Junta.

The funds obtained by means of the admission fees and transport tax are used exclusively for the constitution of a Credit Fund for facilitating advances to producers and encouraging co-operation as far as concerns the amelioration and reduction in the costs of production

The Decree also contains temporary provisions with a view to ensuring immediate action on the part of the consortium. Thus provisions are made for the constitution of an Organization Junta, with headquarters at Valencia, which is responsible for drawing up the Regulations of the consortium and submitting them to the Government for approval, for providing the association and census with all the necessary elements, for fixing the amount of admission fee, etc. With a view to making it possible for the Organization Junta of the consortium to exercise from the very start effective commercial action and at the same time meet the expenses of organization, the National Agricultural Credit Service shall grant it by way of loan at an interest of 5 % per annum, the sum of 1,500,000 pesetas.

France (Indo-China). — Two Orders, of 15 and 17 October 1927 (*Journal Officiel de l'Indochine Française*, No. 84 of 19 October 1927) provide for the establishment of rain measurement and climatological stations in Annam. The observation service shall be carried out by officials appointed for this purpose by the Superior Resident in Annam

IV. — PLANT DISEASES. PLANTS AND ANIMALS HARMFUL TO AGRICULTURE.

Spain. — A Royal Order No. 579 of 15 October 1927 (*Gaceta de Madrid*, No. 303, of 30 October 1927) decrees, in view of the fact that the phytopath-

ological certificates have no fiscal objects, their only object being to identify the exportation order by the number of lots, the qualities, marks and other outer signs, and on application to that effect by the interested parties, that the Customs Offices of the Kingdom should accept phytopathological certificates even if there is a difference between the weight registered in the certificate and the actual weight of the goods, provided this difference does not exceed the limits prescribed for certificates of origin by par. (b) of Rule 4 of Provision 10 of the Customs Tariff, that is to say, 20 % more or less.

France. — An Order of 15 September 1927 (*Journal Officiel* of 24 September 1927) on the advice of the consultative committee adds Belgium to the list of countries attacked by Wart disease and enumerated in art. 1 of the Order of 6 June 1924, modified by the Orders of 20 December 1924 and 2 November 1925 issued in application of the Decree of 19 December 1910 prohibiting the importation into France of potato tubers affected by the Wart disease (*Synchytrium endobioticum*, *Chrysophlyctis endobiotica*).

Another Order of 15 October 1927 (*Journal Officiel*, No. 244 of 20 October 1927) adds Spain to the list of non-contaminated countries, but bordering on a country contaminated by Wart disease as enumerated in art. 2 of the Order of 20 December 1924, 2 November 1925 and 15 September 1927 above mentioned.

Italy (Italian Somalia) — A Decree of 10 August 1927 (*Bollettino Ufficiale della Somalia Italiana*, No. 8 of 31 August 1927) with the object of preventing the diffusion in the colony of diseases and parasites among cultivated plants, prohibits the importation by private individuals of sugar cane stems.

V — CO-OPERATION, INSURANCE AND AGRICULTURAL CREDIT.

Australia (Victoria). — An Act No. 3,510 (21 September 1927) provides for loans for farmers who would be unable without such loans to fallow their land. The loan may take the form of money or of fodder, and shall be secured by a lien on the harvest preceding the date of repayment, i. e., 1 February 1929. In addition to this security the cultivator is also personally liable for the loan. The crops may not be distrained nor the cultivator ejected while the crops are growing.

AGRICULTURAL ASSOCIATIONS

GENERAL, NOTICES

Hungary. — **THE LEAGUE OF HUNGARIAN FARMERS.** — For some years past the League of Hungarian Farmers has arranged to send abroad -- so far to Germany only -- the young sons of Hungarian small farmers whose means do not permit them to do so on their own account.

Under the arrangements of the League the young people sent to Germany are the guests of the families of small cultivating owners; they take part in the ordinary family life and assist the farmer in his field work. After six months and before returning to Hungary they make, in company with their host, a tour of the district in order to familiarize themselves with the features of the local agriculture.

Arrangements are also made whereby young Germans visit Hungary under similar conditions. During the last 4 years more than 300 young Hungarians have enjoyed the advantages of this reciprocal arrangement and the League of Hungarian Farmers now proposes to extend the scheme to Esthonia and Bulgaria and for this purpose has entered into negotiations with the Agricultural Associations in these countries.

The advantages of such a scheme for exchanging young workers are clearly evident, in this way it is possible to supply a serious defect in the instruction and practical agricultural knowledge of agricultural workers who as a rule know nothing of the conditions of agriculture and the progress made in agricultural practice in foreign countries.

Hence the League of Hungarian Farmers is anxious still further to develop the movement which they have initiated and to arrange to send their young nationals abroad in still greater numbers and similarly to receive in return an increased number of young sons of farmers from various foreign countries.

CURRENT NOTES

France. — **CENTRAL UNION OF THE UNITED FARMERS OF FRANCE.** — In view of the near approach of the debate in the Chamber of Deputies on the Bill for Social Insurance, the Central Union of the United Farmers of

France has called a Conference of Farmers in order to inform public opinion on the attitude that the farmers themselves propose to take up in regard to the Bill in question. Speaking generally the Central Union is favourable to this form of social thrift and national solidarity, but considers that it is necessary to proceed slowly with the application of the new burdens and that, as regards the regulations for giving effect to the new law, special attention should be paid to the different conditions prevailing in the various branches of production with special reference to those of agriculture as contrasted with those of industry. The meeting is called for 8 January 1928.

CURRENT NOTICES

AGRICULTURAL AND SCIENTIFIC INSTITUTIONS AND ASSOCIATIONS.

Poultry Service in Canada (Quebec Province). — The Provincial Poultry Service was definitely organized in the Province of Quebec in 1914. Its precursor had been the Experimental Union of Quebec Agriculturists, which had already organized and directed 22 Poultry Breeding Stations. From the time of the foundation of the service until 1927, 167 poultry stations were founded, of which 53 still function, and 23 incubation centres were established, of which 11 are still running, with an individual capacity varying from 3,000-16,000 eggs. The Service's activity shewed itself during this period in many ways:— participation in poultry shows; distribution of eggs to village school children and to housewives' clubs; popular poultry courses, poultry competitions in the farms; "poultry days" in centres where pure strains of the domestic fowl are scarcely known; selection of birds, construction of demonstration fowl houses; regeneration of turkey strains; instruction by the medium of special publications, etc.

The results obtained may be summarized as follows:— Introduction into every county of so called independent or "cold poultry houses"; race improvement by introduction of pure blood; more scientific feeding thanks to growth of special crops and the use of bone crushers; production of autumn and winter eggs as the result of scientific methods of rearing; development of incubation and of artificial rearing which assist the production of eggs at times when otherwise impossible; the sale of eggs and birds by cooperative methods and payments according to the quality of the fowl; methodical fattening and proper preparation for market; regeneration of turkey strains; increase in the number of farmyard poultry in the province from 5,053,038 to 7,354,000, i e., by 42.7%. (J. D. BARBEAU, *L'Aviculture au Canada. La Vie agricole et rurale*, a. 16, t. XXXI, n. 33; 14 août 1927).

Establishment of Olive Associations ("Consorti") in Italy. — Provision has recently been made by the Council of Ministers for encouraging the formation of "consorzi" among olive growers, with the object of facilitating the development of olive growing by the reconstitution of old or broken down oliveyards, by proper control measures against diseases and parasites of the olive and by the establishment of well run nurseries and demonstration and experimental oliveyards. The establishment of these "consorzi" may also be made obligatory by the competent provincial authorities. They will also be

in a position to bring about improvements in the olive oil industry, to develop the production of preserved olives and to organize effectively the trade and the exportation of the products of the oil factory.

There will also be carried out, side by side with the special work of the "consorzi", special studies and research work for which already existing specialized institutions or others to be established and of consorzio type will be made responsible.

The Ministry of National Economy will therefore be empowered to collaborate with consorzi of societies and local administrations whose purpose is the establishment and maintenance of research stations or other institutes dealing solely with olive growing and the oil industry, and will be able to promote and encourage for this purpose experimental work and investigations, as well as the training of experts and of suitable labour. (*Giornale di Agricoltura della Domenica*, XXXVII, n. 23, 14 agosto 1927).

CONGRESSES AND CONFERENCES.

British Empire Agricultural Research Conference, London, October 1927. — The British Imperial Agricultural Research Conference (1), which took place in October last, was an event of no ordinary importance for agricultural science and economics in general, inasmuch as by the circumstances of the case it may be said to have covered the whole range of research problems as occurring in the most diverse parts of the world. The thoroughness of the work of preparation and representative character of the specialists who took part in the discussions or presented reports were in themselves a guarantee that the proceedings would lead to important results, which cannot fail in the future to be of interest outside the limits of the British Empire.

The problem of securing increased agricultural production within the Empire and the fundamental importance of research work in this connection and hence the need for coordination and correlation to secure its full effect were the underlying motives of the Conference. It was also clear that any comprehensive examination of the question as a whole was bound to reveal lacunae in the existing provision of research stations and bureaux of information. Hence when in the course of 1926 the Ministry of Agriculture and Fisheries decided that the time was ripe for holding an Imperial Conference on Agricultural Research in the autumn of the following year, the main outline of a programme was already clear and it only remained to elaborate the details and put in hand the work of preparation.

The Empire Marketing Board (2) which was appointed in the summer of 1926, co-operated with the Ministry in the preliminary work and arranged for the distribution to the Overseas Governments of memoranda on various aspects of agricultural research prepared by experts in Great Britain itself, a starting point for the collection of Empire experiences in these particular fields being thus provided. An important advantage of this collaboration

(1) See also Notes on the International Institute of Agriculture, *International Review of Agriculture*, November 1927.

(2) See Current Notices, *International Review of Agriculture*, July 1927, p. 789.

between the Ministry and the Board consisted in the fact that, though the membership of the latter is limited, it contains representatives of all parts of the Empire.

The Conference was attended by some 170 representative experts or responsible officers, of whom a large proportion came from overseas, and certain details of organization as well as its comprehensiveness were distinctive characteristics.

Briefly defined its objects were the establishment of closer co-operation in agricultural research work throughout the Empire, the setting up of additional research stations, where required, particularly in tropical and sub-tropical countries, the provision on an imperial scale of Bureaux or Clearing Houses for interchanging information of value to research workers, and the whole question of the recruitment, training and interchange of research workers.

In apportioning the actual work it was considered desirable to draw a clear line between administrative and technical questions, the former being referred to an Administrative Commission, the Agenda of which included man power, information bureaux and the provision of a complete chain of research stations, the latter to eleven specialist committees. The subjects dealt with by these committees were as follows :— (1) Veterinary Science ; (2) Animal Nutrition ; (3) Animal Genetics ; (4) Dairying ; (5) Soils and Fertilisers , (6) Plant Pathology (including Mycology) , (7) Plant Breeding ; (8) Fruit ; (9) Entomology , (10) Agricultural Economics (including Marketing) ; (11) Preservation and Transport.

The headquarters of the Conference were at Westminster Hall where the opening plenary sessions and Meetings of the Administrative Commission were held from 4 to 11 October and also the closing sessions during the last week of the month. Accommodation for the Committees was found at the Ministry of Agriculture or in other Government Offices in the Westminster District.

By this arrangement it was possible to utilize the period from 14-24 October for visits to the most important research centres in England, Scotland and Northern Ireland while visits to Wales and certain special stations at no great distance from London were arranged to take place immediately after the close of the Conference.

In this way the Overseas representatives were able to obtain firsthand knowledge of the particular kinds of research work carried out at Cambridge (Special Features, Animal Nutrition, Animal Pathology, Plant Breeding, Parasitology), Edinburgh (Animal Breeding, Animal Diseases, Plant Breeding), Aberdeen (Animal Nutrition, Plant Diseases, Soils), Belfast (Poultry Cold Storage, Flax, Animal Diseases). The Billingham Synthetic Nitrogen works (1) were inspected en route to Edinburgh and among the important centres visited after the close of the Conference, mention may be made of the Rothamsted Experimental Station, East Malling Fruit Station, the Agricultural Economics Research and Imperial Forestry Institutes at Oxford, the Agricultural Departments of the University Colleges of Wales at Bangor and Aberystwith, the Royal Horticultural Society Gardens at Wisley, etc., etc.

(1) A note on the Billingham works will shortly be published in the Review.

The Conference, while on tour, was still able to find time for the detailed Committee work on specific problems and the reports to the closing Plenary Meetings were presented in practically definitive form.

The results obtained were both general and specific. The whole tropical and subtropical Empire was surveyed as a field for organized research and the problem of man power and of the qualifications and training required in research workers was thoroughly discussed. At the same time definitive proposals were made for extending the existing machinery for co-operation between research workers throughout the Empire. It is hoped that three new Imperial Bureaux (dealing respectively with Soil Science, Animal Health and Animal Nutrition) and four Correspondence Centres (for Animal Genetics, Agricultural Parasitology, Plant Genetics and Fruit Protection) will shortly be at work as the direct outcome of the discussions of the Conference. It is worth noting that the Conference expressed itself warmly in favour of the proposal of the International Institute of Agriculture that a World Agricultural Census should be held in 1930-31 and desired that "the attention of the Governments of the Empire should be drawn to the need of co-operating to the fullest possible extent in the project".

It is intended that the Conference shall be held at intervals of five years and it has already been arranged that its next two meetings shall take place in Australia and Canada respectively.

GENERAL NOTICES.

Schemes for Irrigation Works in Mexico. -- President CALLES recently granted an interview to representatives of the press and spoke of several schemes that were under discussion for carrying out the irrigation of vast areas which will necessitate in all an expenditure of over 80 million pesos.

The districts to be irrigated are distributed as follows: Rio Salado, Coahuila and Nuevo León (65,000 ha.), Calles Dam on the Santiago River and Aguascalientes (20,000 ha.) Tuxtepec Dam, Lerma River, Michoacán (50,000 ha.) Rio Mante, Tamaulipas (10,000 ha.); Guatimpape (18,000 ha.); Valley of Mexquital, Hidalgo (30,000 ha.). These schemes include the installation of plant for the production of electric power in connection with the dams made for irrigation purposes. In addition other plans are being carried out for the irrigation of 300,000 ha, using the water of the rivers Yaqui and Mayo. (*Bulletin of the Pan American Union*; August 1927).

Poland and the International Corn Market. -- According to a careful investigation carried out by Dr. Felicjan DEMBINSKI, Germany holds the first place among European nations for the importation of corn from Poland. The Scandinavian and Baltic countries however offer valuable markets for the exportation of Polish corn and particularly of rye, while England imports barley and wheat from Poland. Czechoslovakia might also become a valuable market, while other European countries, such as France and Italy, whose homegrown supply of corn is inadequate, have only occasional dealings with Polish growers.

Polish corn production could be increased either by the extension of acreage or by increasing the return per acre. According to Dr. DEMBINSKI, Russia, Poland, Rumania and Hungary are the countries destined to exercise an influence on the corn markets of the world as exporters. Meanwhile Polish exportation has acquired a character of permanent stability. (Dr. Félícjan DEMBINSKI "*Polsha a Medzynarodowy Rynek Zbozowy*". Warsaw, 1927, Vol. in octavo, pp. 105).

A Five Year Programme for the Development of the Sugar Industry in Russia. — During the last few years this industry has gradually been recovering from the depression from which it suffered during the war. The responsible officials have drawn up a programme to be carried out in five years by which they will be able to cope with a condition which so far has proved economically unsound. The scheme includes first of all an increase of the area under beet, because at the present moment it is not sufficient to cover the cost of management owing to the so called "Minimum Law". While in the present season 167 factories will be at work with an estimated production of 11,480,000 quintals, in 1931-32 the number should reach 202 with an estimated production of 18,850,000 quintals. Some factories will be closed or remodelled, since by the "Minimum Law", only a certain number are allowed for a given area. The new concerns will all be fitted with the most modern plant with the object of reducing the cost of production.

According to the proposed scheme the sugar industry may in five years time calculate on doubling the present production. A revision of duties and prices will however be necessary so as to bring the produce within the reach of the general consumer.

It is also proposed to set up experiment stations and every effort is being made to encourage the cultivation of sugar beet from seed, a method which has always proved successful in Russia. The Sugar Trust will probably send its representatives to France, England and Germany and to other countries in order to find trade outlets for the product. (*The Planter and Sugar Manufacturer*, New Orleans, Vol. I, XXVIII, No. 23, June 4, 1927).

Important Irrigation Schemes for Armenia. — A complete investigation of the natural resources of Armenia has been proposed and the most important part of it will be the examination of the basin of Lake Gottcha or Sevang. It is believed that the waters of this huge mountain lake might be used to irrigate land fit for cultivation but hitherto unused. In any case a possible lowering of the level of the lake will be considered at the same time. Hydraulic investigations will be carried out with this object and also enquiries into the climatic conditions, the flora and the nature of the soil of the district and the agricultural value of the land to be irrigated. As change in the level of the lake cannot fail to affect its fauna, special studies will be made — a hydrobiological station is now being set up — and thus the conditions for the regulation of the fisheries of the district will be determined. (*Nature*, vol. 120, No. 3013, July 30, 1927).

Unsuccessful Attempts to discover Potash Beds in Switzerland. — A Swiss society had, towards the end of 1926, begun drilling in the neigh-

bourhood of Allschwyll (Canton of Basle) in the hope of finding mineral potash or rather to discover the possible position of a continuation of the Alsatian beds in that locality. This is the second attempt of the kind undertaken in the neighbourhood of Allschwyll, but it proved unsuccessful and no deposits were discovered although a depth of 900 metres was reached. (*Die Futter- und Düngemittel-Industrie*, XVI. Jahrg., Nr. 14, 15 July 1927).

The Dairy Industry in Moravia. — This industry had fallen off for a time largely owing to heavy duties, either in connection with the exportation of the product or its importation into Austria, but is now beginning to prosper again. A good number of milk co-operative societies have been formed. The production of butter and cheese is considerably greater than in the first years after the war and national exhibitions are now held every five years which advertise the progress made by the industry. As regards the chief dairy establishments the Co-operative Society of Troppau (which was a flourishing concern before the war and at that time supplied from 150,000 to 200,000 litres of milk to Vienna) is to be set up again and reference may also be made to the Odra cooperative which was started in 1925, fitted with modern appliances and is capable of producing 30,000 litres of milk a day.

Moravia produces to day 1,200,000 pounds of butter a year. In 1920 Czechoslovakia imported considerable quantities of Danish butter, but in 1925 the home production was equal to national needs and left a small surplus for exportation.

Both Moravian and Silesian dairy concerns have formed an association which has its headquarters at Brunn

There are more than two million cows in Czechoslovakia and from 10 to 12 million litres of milk are produced every day. (*The Creamery and Milk Plant Monthly*, Vol. XVI, No. 3, March 1927).

NOTES ON THE INTERNATIONAL INSTITUTE OF AGRICULTURE

INTERNATIONAL SCIENTIFIC COUNCIL AND PERMANENT COMMISSION OF AGRICULTURAL ASSOCIATIONS (1)

The formal opening session of the meetings of the International Scientific Council and the Permanent Commission of Agricultural Associations took place on 7 November 1927 at the International Institute of Agriculture.

His Excellency M. Benito MUSSOLINI, Chief of the Italian Government, took personal part in the proceedings. In an inspiring and remarkable speech he addressed himself directly to the distinguished representatives of the agricultural sciences and of the agricultural associations assembled at the Institute to express his warm satisfaction at meeting them on the occasion. He made it clear that it was due to the strenuous work of the International Institute of Agriculture and particularly of its President that within so short a time it had been found possible to give effect to the recommendation of the Italian Government that these two new bodies should be established, adding that these bodies may fairly be regarded as two potent forces for strengthening the effectiveness of the Institute in carrying out its responsibilities for international agricultural policy.

The International Scientific Council is a consultative organ of the Institute, consisting of experts from all parts of the world chosen by the Permanent Committee of the Institute on the nomination of the various Governments.

The Council is divided among 27 Commissions formed of experts grouped together according to their special competence; it will be called together whenever the Institute considers that it is necessary to bring before it the most urgent problems of agriculture. In this way there will be brought about in the field of agriculture not only a close collaboration between the adhering States, such as was provided by the Constituent Convention of 1905, but also the co-operation as regards technical and scientific questions of the most distinguished specialists in international agriculture, which under the aegis

(1) The purpose of the present notice is simply to give a brief summary of the objects of the International Scientific Council and of the International Commission of Agricultural Associations and a general account of the meetings which took place from 7-11 November. In later issues it is proposed to publish reports on the work of the Council and of the Commission. (Ed.).

and co-ordinating influences of the Institute cannot but be fruitful in important results as regards special studies and recommendations.

The first meeting of the International Scientific Council may therefore rightly be considered as an event of exceptional importance not merely for the International Institute of Agriculture but for the agriculture of the world at large. More than 250 experts belonging to 52 countries took part in the plenary sessions and also in the meetings of the 27 Commissions which were held from 7-14 November. Both the importance and the wide field covered by the preparatory work accomplished, including the presentation of over 200 reports, to which may be added the high significance of the decisions adopted and the recommendations made regarding all branches and all aspects of agricultural science, are proof of the vitality and wide potentialities of the new body as well as of its thoroughly comprehensive character.

The decisions and resolutions of the Commissions will be brought before the Permanent Committee of the Institute, which will consider the best means to adopt for giving effect to the proposals made and arrange that all the valuable scientific material resulting from the meeting shall be utilized to the fullest advantage and be made known and given practical effect through the publications of the Institute and by other methods.

The meeting of the Permanent Commission of Agricultural Association of which more than 200 Associations, representing as many as 31 States, form part, was equally important. The establishment of the Commission gives effect to a desire expressed not only on many occasions dating from the earliest years when the Institute began to carry out its important duties, but also in the Message by which His Majesty Victor Emmanuel III proposed that the International Institute of Agriculture should be founded, wherein the new body was described as a means for uniting all the agriculturists of the world.

Hence the Permanent Commission of Agricultural Associations is responsible for keeping in continuous relations not only with the Associations but also to act as a link between them and the Institute, in this way bringing about an effective collaboration as between the independent forces of agriculture and those bodies which are of an official State character.

This function of the Commission is provided for in its original constitution, the principles of which were decided by the General Assembly of the Institute and the regulations by the Permanent Committee of the Institute in 1925 on the basis of proposals made by the President of the Institute, Delegate of Italy. According to these regulations the Permanent Commission of the Associations constitutes a consultative body of the International Institute of Agriculture. It is therefore empowered to submit to the Permanent Committee of the Institute all questions which are of interest to agriculture in general and to the associations in particular, while the Permanent Committee for its part is authorized not merely to request the advice of the Commission on all questions regarding which it may consider it desirable that this body should be consulted but it has also the power, within the limits of its competence, to take steps for encouraging the development and the activities of the Associations.

At the close of the meetings of 7-12 November a general session of the Delegates of the Associations, after a very full and detailed discussion, de-

clared by an unanimous vote that the International Commission of Agricultural Associations was duly constituted, in approving a motion which contained also proposals for making the work of the Commission itself effective. The terms of the motion adopted will at an early date be submitted to the Permanent Committee of the Institute, which will give definite shape to these proposals under the form of effective regulations and decide as to the best means for bringing about a profitable collaboration between the Institute and the Associations.

The Presidential Bureau of the Meeting of the Delegates representing the Associations, which consisted, in addition to the Honorary Presidents, Miss MATTHAEI of the International Labour Office and the Marquis de VOGÜÉ, President of the International Commission of Agriculture at Paris, of the following: MM. POSTHUMA (Netherlands), President; Brandes (Germany), TORRES FILHO (Brazil), AZARA (Spain), GAUTHER (France), ROBBINS (England), PICKSTONE (South-Africa), Vice-Presidents and THAON DE REVEL (Italy), reporter, continues to function as the Presidential Bureau of the Permanent Commission of Agricultural Associations of which, in accordance with the regulations, the President and the General Secretary of the International Institute of Agriculture are also members.

At the closing session of the International Permanent Commission of Agricultural Associations and of the International Scientific Agricultural Council, M. De Michelis, President of the International Institute of Agriculture, was therefore well justified in expressing amid general enthusiasm his deep satisfaction with the excellent results of the meetings. Special reference was made to the valuable support given by the Governments, who have recognised the value of the scheme of the Institute and nominated their best known experts to serve on the Scientific Council, and their most representative associations to take part in the Commission of the Associations, while some of the Governments, for example France, Germany and Italy, had also sent members of their Ministries as observers. The President also spoke warmly of the assistance given by the Permanent Committee which, as a body, had done much by its influence and its work to ensure the success of the gathering, as well as of that given by members in their individual capacity, who, under the title of patrons, had presided at the 27 Commissions of the Scientific Council. He also referred to the support given by the representatives of international bodies (League of Nations, International Labour Office, International Institute for Scientific Management, International Commission of Agriculture, International Parliamentary Trade Conference, International Masters' Conference, the Italian Institute of International Law, the International Law Association (Italian branch), and to that given by Scientific Associations and Institutions (the International Bureau for Household Management Teaching, the International Limnology Association, the University of Toronto, and others) which through their appointed observers followed the course of the programme, thus giving evidence of their appreciation of the great importance and scope of the meetings.

The President desired particularly to express to the Experts on the Council as well as to the Delegates of the Associations the cordial thanks of the Institute for their effective and enlightened collaboration, and its sense of the

valuable work accomplished by the 27 Commissions of the Council. He added that the conclusions reached and the recommendations made would be the subject of most careful consideration by the Permanent Committee of the Institute. In conclusion a reference was made to the praiseworthy efforts of the Bureaus of the Institute, which had loyally responded to the multifarious demands made on them in connection with the preparation for the meetings and during their progress. The President then declared the Conference closed, stating that as a result of the foundation of the International Scientific Council and of the Permanent International Commission of Agricultural Associations, the Institute, being thus assured of the assistance and support of the unofficial forces of agriculture and of the potent forces of science, would be enabled to maintain its great traditions and to go forward with confidence along its appointed path so as ultimately to attain a full realisation of its comprehensive programme for the benefit of world agriculture.

Permanent Committee. — The Permanent Committee of the International Institute of Agriculture has recently had to deplore the loss of one of its most devoted and valuable colleagues in the person of Baron LAZAR de POLIAKOFF, Delegate of Persia, who died at Rome on 18 December 1927.

The following appointments of Delegates to the Permanent Committee have been made recently :—

Estonia : M. Karl TÖFER, Minister at Rome.

Latvia : M. Pierre SEVA, Minister at Rome.

Paraguay : M. Alessandro BOCCA, Consul at Rome.

Venezuela : M. Parra PEREZ, Minister at Rome.

The Delegate of Finland, M. Emil HYNNINEN has been invited to take up the duties of Minister of Communications for the Government of Finland but is still retaining his position as Delegate at the Permanent Committee.

Received by the Library

Ber.=Berlin, Cam.=Cambridge, Gen.=Genève, Lon.=London, Mad.=Madrid, Mil.=Milano
N.Y.=New York, Par.=Paris, Tor.=Torino, Wash.=Washington.

Aereboe, F. Der Einfluss des Krieges auf die landwirtschaftliche Produktion in Deutschland. Stuttgart, Deutsche Verlags-Anstalt, 1927. 233S., Tab., 25cm. (Veröffentlichungen der Carnegie Stiftung für internationalen Frieden. Wirtschafts und Sozialgeschichte des Weltkrieges).

Beutl, R. Die Gullewirtschaft: ihr Betrieb und ihre Bedeutung unter spezieller Berücksichtigung tschechoslowakischer Verhältnisse von Rudolf Beutl. Prag, Verl. der Deutsche Sektion des Landeskulturrates für Böhmen, 1926. 271S., Abb., Tab., 25cm. (Deutschland Landeskulturrat. Sektion für Böhmen. Arbeiten, N° 38).

Bridges, A. Sugar beet: costs and returns for the year 1925-1926 by A. Bridges and R. N. Dixey. Oxford, Agricultural Economics Research Institute, [1927?], 71p., tab., 24.5cm.

Cramer, M. Les sucres et leurs dérivés. Par. Gaston Doin et cie, 1927. 353p., tab., 18cm. (Encyclopédie scientifique).

Dechambre, P. La vache laitière, 3^e éd. Par., Maison rustique, 1926. 338p., ill., tab., 19cm. (Zootechnie spéciale).

Deutschland. LANDWIRTSCHAFTSRAT. PREISBERICHTSTELLE. Marktnachachtung und Absatzgestaltung für landwirtschaftliche Erzeugnisse. Geschäftsbericht für das Geschäftsjahr 1926-27. Ber., "Deutsche Tageszeitung", 1927. 100S., Tab., 25.5cm.

Grassi, G. Lezioni sulla malaria. Roma Provveditorato generale dello Stato, Libreria, 1927. 280p., ill., 24cm.

Great Britain. MINISTRY OF AGRICULTURE AND FISHERIES. Report on markets and fairs in England and Wales. Lon., His Majesty's Stationery Office, 1927. v.2, pl., 24.5cm. (Great Britain. Ministry of Agriculture and Fisheries. Economic series, n° 14).

« v. 2. Midland markets ».

Ingeniörsvetenskapsakademien. Forskning och teknik i lantbrukets tjänst. Stockholm, Svenska bokhandelscentralen, [1927]. 155p., ill., tab., 20.5cm. (Ingeniörsvetenskapsakademien. Meddelande Nr. 71).

Recherches et technique dans le service de l'agriculture.

Italia. ISTITUTO DI ECONOMIA E STATISTICA AGRARIA. Prezzi e costi di prima lavorazione delle piante nei boschi italiani: prezzi di macchiatico. Firenze, Mariano Ricci, 1927. v I., 27.5cm.

« v. 1. Le Alpi e l'Appennino ligure ».

Michotte, F. Les kapotiers et succédanés: culture et exploitation. Par., Société de propagande coloniale, [1927]. 82p., ill., 24cm. (Michotte, Félicien. Traité scientifique et industriel des plantes textiles).

Mignini, L. L'ordinamento culturale di un'azienda agraria e i miglioramenti introdotti nella coltivazione del grano: applicazioni pratiche

di sperimentazione agraria locale. Città di Castello, "Leonardo da Vinci", 1928. 98p., front., ill., tab., diagr., 32cm.

The pig industry and bacon curing in Sweden. [Stockholm, Nordisk rotogravyr, 1927]. 47p., ill., pl., 19.5 cm.

« Copies may be obtained from the Agricultural Adviser to the Swedish Legation, London ».

Romanet du Caillaud, J. Les dommages de guerre agricoles : leur revision, leur évaluation. Par., Librairie de la construction moderne, [1927]. 366p., tab., 25cm.

Sartorius von Waltershausen, A. Die Weltwirtschaft und die staat-

lich geordneten Verkehrswirtschaften. Leipzig, G. A. Gloeckner, 1926. 416S., 24cm. (Schriften des Weltwirtschafts-Instituts der Handels-Hochschule, Leipzig, hrsg. von Dr Ernst Schultze, Bd. 2).

New Periodicals.

New Zealand. FOREST SERVICE Bulletin, n° 1 1923. 39p., ill., pl., 24.5cm. irr.

New Zealand. FOREST SERVICE Circular, n° 3, 1925. 15p., 24.5cm. irr.

New Zealand. FOREST SERVICE. Professional paper. n° 1, 1924. 56p., 24.5cm. irr.

Director responsible : Prof. CARLO DRAGONI.

Roma — « L'Universale » Tipografia Poliglotta (C C I. di Roma, n° 18891).

INDIAN AGRICULTURAL RESEARCH
INSTITUTE LIBRARY
NEW DELHI.

[illegible]